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TECHNICAL MEMORANDUM

To: Stan Komperda
From: Ron St. John *RBSJ*
CC: Steve Faryan
Subject: **The Lockformer Company Responses to the Illinois Environmental Protection Agency Comments Dated August 20, 2003 on the Remedial Action Plan for Areas 1 and 2 Dated July 7, 2003.**
Date: February 16, 2004

INTRODUCTION

At the request of the Illinois Environmental Protection Agency (Illinois EPA), the Lockformer Company (Lockformer) submitted the Remedial Action Plan for Areas 1 and 2 (RAP) on July 7, 2003. After this submission, the Illinois EPA requested Lockformer to submit an additional package of information on July 25, 2003 to support the development of the soil remediation objectives (SROs) contained in the July 7, 2003 RAP submittal. Based on these submittals, the Illinois EPA issued comments on the RAP on August 20, 2003. As a result of these comments, discussions between the Illinois EPA and Lockformer representatives were undertaken regarding the geology, hydrogeology, and solute transport processes on the west side of Area 2 of the Lockformer site, and an additional scope of work was developed to provide for additional investigations there. The scope of work regarding these additional investigations on the west side of Area 2 was approved by the Illinois EPA in a letter dated October 24, 2003.

The field investigations on the west side of Area 2 have recently been completed. Representatives of Lockformer and the Illinois EPA have agreed that Lockformer will submit a report on March 5, 2004 that summarizes these investigations, and modeling to develop SROs for the upper till and lower till for Areas 1 and 2 at the site. In anticipation of this March 5, 2004 submittal, the Illinois EPA has requested that Lockformer respond to the August 20, 2003 comments on the July 7, 2003 RAP, and a dialog subsequently occur regarding any points of contention in order for the March 5, 2004 submittal to be as complete and final as possible. Because of this request, Lockformer has developed the comment responses provided below. For clarity of review, the original Illinois EPA comment is provided in italics.

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GENERAL COMMENTS

1. **Groundwater Flow in the Mass Waste Unit:** Clayton makes the argument in the RAP that the mass waste unit in the northern portion of Area 2 (as far south as cross-section A-A' on Figure 2.1-6) is not saturated. The groundwater containment remedy that Clayton recommends subsequently ignores this area of the site. However, this claim does not appear to be supported with sufficient evidence:

- In cross-section A-A', Figure 2.1-6, a constant groundwater elevation of 655' is shown throughout the cross-section, located below the mass waste unit. However, it is unclear how this groundwater elevation was determined. No groundwater wells along this cross-section are screened within the mass waste unit, and could not have been used to determine such an elevation.

For the sake of simplicity, Lockformer will use groundwater elevations obtained on specific measurement dates in future submittals. No groundwater monitoring wells are located along cross-section A-A' because, as indicated in the RAP text, the prevailing condition in "the subsurface sediments associated with the mass waste sand and gravel are unsaturated along this cross-section." To the extent possible, Clayton has tried to avoid the installation of dry wells.

- Two groundwater samples were, in fact, collected from the mass waste unit at the western boundary of cross-section A-A' (CSB-1839 and CSB1840).

Two groundwater grab samples were available for acquisition at soil boring locations CSB-1839 and CSB-1840 due to a structural low spot in the upper surface of the lower till in this area. Figure M-1 has been developed for the March 5, 2004 submittal and illustrates the structural contour surface of the lower till. The soil boring data used to develop the surface plot is identified on the figure. Figure M-2 (also developed for the March 5, 2004 submittal) illustrates the structural contour surface of the lower till with the static water levels from groundwater monitoring wells completed in the mass waste aquifer on October 17, 2001 superimposed on it. The October 17, 2001 static water level data were chosen for this representation because these data represent the highest elevation measured in the water table in Areas 1 and 2. In general, groundwater saturates the mass waste sediments above the lower till south of the static water level line on Figure M-2, and in the depression occurring around monitoring well MW-500D.

A review of Figure M-2 illustrates the approximate extent of the highest water table occurrence across the structural contour surface of the lower till. It can be observed from this figure that groundwater can be expected to saturate the mass waste sand and gravel sediments above the lower till near soil borings CSB-1839 and CSB-1840 when the water table within the mass waste rises above an elevation of approximately 654 msl. The groundwater saturating

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these mass waste sand and gravel sediments near CSB-1839 and CSB-1840 can be expected to flow to the west/southwest in accordance with the prevailing flow of the mass waste unit groundwater.

- *At least one soil boring log (CSB-1817) indicates that approximately 3 feet of saturated thickness exist in the mass waste unit, although cross-section A-A' does not reflect this fact.*

A review of Figure M-1 indicates that Soil Boring CSB-1817 occurs in an isolated depression in the surface of the lower till and is similar but smaller than the one that exists near MW-500D. The depression near MW-500D was described in the text and depicted in cross-section C-C' in the October 18, 2002 Supplemental Comprehensive VOC Investigation Report. Special consideration was given to this area in the RAP where groundwater containment was specified for the area around MW-500D (CSB-1829).

It is likely the depression in the upper surface of the lower till near CSB-1817 accumulates precipitation infiltration and, because of this depression's proximity to the Area 2 source area, merits further investigation. Accordingly, Lockformer will perform a soil boring at the location of former soil boring CSB-1817 and collect a groundwater grab sample from the saturated zone within the mass waste unit above the lower till for laboratory analysis of site contaminants. If the groundwater analytical results from this sample merit further consideration of this area, the feasibility study will consider this when evaluating the remedial options necessary for effective implementation.

Groundwater elevations in the mass waste unit have historically fluctuated up to several feet. Such a fluctuation (compared with the groundwater elevation shown in cross-section A-A') would cause a majority of the boring locations to exhibit saturated mass waste conditions.

Figure M-2 utilizes the highest water level elevations recorded to date in Areas 1 and 2 and demonstrates the highest occurrence of the water table condition within the mass waste sand and gravel there. The maximum recorded site water levels do not support the notion that fluctuation up to this maximum would cause a majority of boring locations along cross-section A-A' to exhibit saturated mass waste conditions. In fact, only one boring, CSB-1817, would have been likely to have been saturated on the October 2001 measurement date of these high water level conditions. On this date, there was approximately 0.25 feet of groundwater saturating the mass waste sand and gravel sediments above the lower till surface at the CSB-1817 location.

- *The fact that groundwater contamination was found in the mass waste unit at the far western boundary of the site (GW-1839 and GW-1840) appears to provide strong evidence that not only do saturated conditions exist in the mass*

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waste unit, but that they provide a continuous flow pathway from the possible sources of this contamination located further to the east.

There is little doubt that contamination from the source area in Area 2 has migrated down to the water table condition that exists within the mass waste sand and gravel sediments in Area 2. It is also apparent that precipitation infiltration carrying contaminants leached from the source area in Area 2 have migrated down to the upper surface of the lower till and migrated to the vicinity of the west property boundary. However, a review of Figures M-1 and M-2 indicates that the structural surface of the lower till is sloped to the south to the water table condition that exists within the mass waste sediments, and can be expected to direct migration along the unsaturated surface of this lower till toward the water table condition in the mass waste unit to the south. In the vicinity of soil borings CSB-1839 and CSB-1840, the lower till surface is sloped to the southeast.

Corroboration of these contaminant transport observations exists in the form of investigation soil borings CSB-1845, CSB-1846, CSB-1844, CSB-1850, CSB-1851, and CSB-1852 along the west side of the Ogden Corporate Center Building, which indicate non-detect concentrations for all soil samples in the mass waste unit and the upper surface of the lower till. As a result, the site contaminant transport data suggest that the only continuous migration pathway available to offsite locations exists in the saturated mass waste unit sediments, with subsequent transport within this groundwater unit toward the west/southwest with its prevailing flow.

Any proposed remedy for achieving the groundwater remedial objectives at the site must assume that saturated conditions exist in the northern portion of Area 2.

It is Lockformer's opinion that an overwhelming amount of data have been collected at the site to conclusively show that saturated conditions do not exist in the northern portion of Area 2 in question. Figures M-1 and M-2 (supplied with this memo) demonstrate this. Additional details regarding these recent data collection efforts will be supplied in the March 5, 2004 submittal.

2. **Groundwater Containment:** *Clayton's proposed remedy for groundwater containment is the use of five separate pumping locations in the mass waste aquifer. We believe that it will be difficult to demonstrate that such a system is adequately containing the contamination:*
 - *Little is actually known about flow patterns in the mass waste unit. The potentiometric surface map shown on Figure 2.1-8 indicates that a very flat gradient (0.003) exists across the site. Slight fluctuations in groundwater elevations could dramatically change local flow directions (and even saturated conditions within the aquifer, as noted above). Designing a well*

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collection system that would effectively contain such an aquifer would be difficult given the existing data at the site.

Lockformer strongly disagrees with this comment. The Lockformer site has a large amount of data available for review, and to provide a basis for understanding groundwater flow and contaminant transport processes. Lockformer does agree that additional data collection over time provides a better understanding of the processes at work. For instance, additional static water level data collection in more recent times in the vicinity of the west side of Area 2 has shown that an area of groundwater recharge exists on the Ogden Corporate Center property in the vicinity of groundwater monitoring wells MW-1123 and MW-1112S. As a result, the potentiometric surface map for October 17, 2002 water level data provided in the RAP as Figure 2.1-8 has been modified based on the understanding gained through this additional data collection and is provided with this response to comments. Additional impacts potentially from the groundwater recharge occurrence on the Ogden Corporate Center property will be analyzed in the March 5, 2004 submittal.

Lockformer disagrees that a hydraulic gradient of 0.003 is flat. In fact, it is typical for glacial aquifers in the humid mid-continent region. Slight fluctuations in groundwater elevations do not significantly change the local flow direction or saturated conditions across the aquifer as is made obvious through a review of Figures M-1 and M-2. In fact, the distribution of contaminant occurrence within the mass waste unit groundwater is by definition (as are all groundwater contaminant plumes) a nearly perfect picture of the average groundwater flow over the period of contaminant occurrence. Observations of the contaminant transport within the mass waste sediments in Area 2 suggest that concentrations decrease from north to south (MW-522, MW-1117, and MW-521) as a result of recharge to the mass waste water table from precipitation infiltration carrying contaminants that run off the unsaturated, upper surface of the lower till to the north. The most recent groundwater analysis from these wells indicates the following concentrations of TCE: MW-522 exhibited a concentration of 257 ug/l, MW1117 exhibited a concentration of 41.8 ug/l, and MW-521 exhibited a concentration of 11 ug/l.

Once the contaminants reach the mass waste unit groundwater in Area 2, they flow toward the west/southwest with the prevailing flow of groundwater movement in these sediments. However, it is apparent that groundwater contamination within the mass waste sediments has not migrated substantially. This may be due in part to the groundwater recharge occurring on the Ogden Corporate Center property. However, it is just as likely due to the low hydraulic conductivity and relatively high organic carbon content of the mass waste unit sediments on the Lockformer site (discussed in more detail later in these comment responses). Because of the data collected at the site and these observations, a well collection system to contain contaminated groundwater in Area 2 would be very effective.

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- *The mass waste aquifer is fairly thin in many places (on the order of several feet); it is unlikely that this aquifer could be reliably modeled (Darcy's Law may not be valid, "undulating" and non-continuous saturated conditions, etc.).*

It is true that the mass waste unit aquifer is wedge-shaped. The perception that the aquifer is undulating is likely due to previous misconceptions related to the unsaturated surface of the lower till in the northern portion of Area 2. Very seldom are all – or even the majority of – the assumptions related to Darcy's Law satisfied. Lockformer believes that modeling application of Darcy's Law to the mass waste unit at the Lockformer site will result in reasonable estimates of groundwater movement.

- *Pumping relatively small flow rates from five points in a shallow aquifer will not likely contain the areal extent required to protect the western boundary of the site. The capture zone of each well is likely to be fairly limited in such a shallow (thin) aquifer. It appears that Clayton is relying upon wide areas of the aquifer draining into the specific "undulations" into which the recovery wells are installed, but there is no evidence that adequately identifies the actual location of these drainage points to the required precision needed for such a capture strategy to work. No quantitative analysis demonstrating the effectiveness of this approach was submitted by Clayton; it is likely that none could be developed, given the existing data.*

As stated previously, an overwhelming amount of data have been developed to define the structural contour surface of the lower till, and are presented in Figure M-1. These data have been used in conjunction with water level data from monitoring wells to define the historic maximum extent and thickness of the mass waste unit aquifer in Figure M-2. These data indicate the wedge-shaped, mass waste unit aquifer sediments have a saturated thickness of approximately 15 feet toward the central portion of the aquifer. It is a misconception that Clayton has relied upon wide areas of the mass waste unit aquifer to drain into specific undulation for the proposed groundwater containment system to work. As stated in the July 7, 2003 RAP, the groundwater containment wells were located on the following basis: (1) to capture site contaminants in groundwater prior to migrating across the facility boundary, and (2) in areas that exhibit the greatest aquifer saturated thickness to allow the greatest pumping rates and maximum capture.

It is true that no quantitative analysis demonstrating the effectiveness of the proposed containment system was submitted. It is not true that given the existing data it would be difficult to perform such an evaluation. However, these evaluations are always dependent upon the accuracy and spatial variation of hydraulic conductivity data. Experience has shown that a lot of time and money can be saved by installing the containment system and adding a few more wells if the necessary hydraulic capture is not achieved, instead of

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continuing to evaluate and demonstrate the potential for the system to be effective.

Because of the difficulty in demonstrating that complete capture of the mass waste aquifer would be achieved under the proposed remedy, an additional remedy should be evaluated as part of this feasibility study: a cutoff trench located at the western boundary from which groundwater would be pumped and treated (presumably at a similar rate as that proposed for the collection well scenario). Such a remedy would provide more assurance to the Illinois EPA that the groundwater remedial objectives will be achieved at the property boundary, and will provide a more reasonable approach to the containment of a thin aquifer.

A cutoff trench installed at the western boundary of Area 2 will be evaluated as part of the feasibility study to be submitted by Lockformer. However, Lockformer has several concerns regarding the employment of an interception trench at the site. For instance, one of the most problematic areas of the site, the location of former monitoring well MW-500D, would not be addressed by the installation of an interception trench.

3. ***Remedial Objectives in the Lower Till:*** Clayton has argued that development of remedial objectives for the lower till is "unreasonable." No regulatory mechanism within the TACO framework allows for this claim. Remedial objectives are to be developed for each media at the site exceeding Tier I criteria. The lower till is no exception; to the contrary, the levels of contaminants present within this zone are such that they cannot be ignored. If the lower till is, in fact, protective of the lower bedrock aquifer, then an appropriate remedial objective can be developed based upon this fact.

Lockformer will develop remedial objectives for the lower till and present them in the March 5, 2004 submittal.

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SPECIFIC COMMENTS

1. *The submitted document is actually a feasibility study, and not a Remedial Action Plan, according to Illinois EPA definitions. A RAP would require far more detail than is included in the current submission. The document should be renamed.*

Per the recent discussions between Lockformer and the Illinois EPA, Lockformer will submit a feasibility study to the Illinois EPA after receipt of the state's written determination that the results of the Comprehensive VOC Investigation fully determine the nature and extent of contamination in Areas 1 and 2, and written approval of the Remedial Objectives for the site.

2. *The basis upon which the groundwater elevations shown in the various cross-sections was developed should be provided.*

For the sake of simplicity, Lockformer will use groundwater elevations obtained on specific measurement dates in future submittals.

3. *The potentiometric surface map for the mass waste unit shown on Figure 2.1.8 appears to include data from wells that are not screened within the mass waste unit. (For example, MW-1114S and MW-1118). The screened intervals of all of the wells shown on this figure should be checked and revised accordingly.*

See the revised Figure 2.1-8 provided with this submittal.

4. *Page 2, 3rd paragraph, Soil boring logs for CSB-1851 and CSB-1852 are not included in Appendix A.*

Boring logs for CSB-1851 and CSB-1852 are provided as Attachment M-1 with this response to comments.

5. *Page 5, a plan-view map that shows the thickness of the lower silty-clay layer should be provided. This map should include locations that are used in preparation of this map and the lower silty-clay layer thickness at each of the locations.*

An isopach map of the lower till will be developed and presented in the March 5, 2004 submittal.

6. *Page 6, 2nd paragraph states, "The potentiometric surface map in Figure 2.1-8 suggests that bifurcated flow around the lower till high in the vicinity of MW-1105D causes groundwater west of CSB-1812 (cross-section Y-Y') to flow west toward Ogden Corporate Center property in the vicinity of monitoring wells MW-1123 and MW-1112S." What is the groundwater elevation in well MW-1105D? How does this elevation compare to the elevation of the lower till at this location? A table should be included summarizing groundwater elevations at the Site during the last several years to evaluate extent of water level fluctuations.*

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As can be observed from a review of Figure M-1, the potentiometric surface in the mass waste aquifer must reach approximately 654.75 near MW-1105D before saturated conditions in the mass waste unit occur above the lower till at this location. Since the summer of 2002, water levels have fallen below this elevation and have caused irregularities in the groundwater flow patterns in this area (making the data difficult to contour without consideration of this structural high in the lower till surface). As a result, the recent potentiometric surface maps have included the approximate area where this unsaturated condition occurs within the mass waste unit.

A table summarizing static water levels obtained at the site in monitoring wells will be provided in the March 5, 2004 submittal.

7. *Page 8, 2nd paragraph, Figures 2.2-2 to 2.2-8. The instances when the extent of contamination above the lowest Tier 1 objective is inferred should be identified on these figures. For example, on Figure 2.2-4, the delineation north of CSB2083 and CSB2082 is inferred.*

The applicable figures will be revised to identify the inferred portions of the delineation with a dashed line.

8. *Page 9, 1st paragraph, the slug test data and analysis should be provided.*

The slug test data for Areas 1 and 2 at the Lockformer site are provided with this memo as Attachment M-2. A summary of all of the hydraulic conductivity data for Areas 1 and 2 at the Lockformer site is provided as Table M-1. All slug test documentation data is provided in Attachment M-1 to allow for interpretation of the data. The only clarifications necessary for a review of the slug test data are the following:

- The data as recorded by the data logger are “positive down.” This means that as the water levels change in a downward direction, they increase positively from the datum and, as they change in an upward direction, increase negatively from the datum.
- Two different reference datum were used for the tests. The “test start sequence” utilizes the water level from the displacement change as the reference datum, and the “current sequence” utilizes the static water level as the reference datum. Based on whether a rising head or a falling head test was under evaluation, and which reference datum was used in the data logger, the data needed to be inverted and/or corrected for the negative values caused by the positive downward data logging.
- The hydraulic conductivity values were determined by curve matching when a reasonably good match to the predictive curve was available. When the data deviated appreciably from the predicted curve, a least squares regression method was used to determine the hydraulic conductivity.

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9. *Page 9, last paragraph discusses the use of a retardation factor to modify the groundwater specific discharge. Illinois EPA does not allow the use of a retardation factor in this context. Instead, the groundwater velocity must be used.*

Lockformer takes the word "context" to mean within the limits of a Tier II evaluation. Lockformer is unaware of any specific requirement within the 35 IAC 742 regulations that would restrict them from this evaluation otherwise. The retardation factor in groundwater flow and its determination, are described and discussed in nearly every text, and IEPA/EPA guidance document discussing solute transport processes and modeling. Lockformer does not consider neglecting the retardation factor for evaluations at the Lockformer site to be consistent with the general viewpoint held by the scientific community on solute transport processes. An abundant amount of data indicates that retardation has significantly impacted solute transport processes at the site, and should be considered during development of the remedial objectives.

For instance, it is obvious that pure product TCE was discharged onto the ground as dense non-aqueous phase liquid (DNAPL) at several locations in Areas 1 and 2 of the site. This resulted in elevated concentrations of TCE migrating downward through the upper till to the mass waste unit and ultimately down to the upper surface of the lower till. As can be observed from a review of Table M-1 supplied with this memo, the vertical hydraulic conductivity associated with the lower till is very low, and would require a substantial period of time to penetrate the lower till to any significant depth. However, extensive sampling of the lower till suggests significant penetration of this unit by TCE, suggesting a significant time period since the first exposure to its migration. These data, experience, and most recent research available on the penetration and migration of DNAPL from spill locations suggest the TCE has been in contact with the mass waste and lower till for a long period of time in Areas 1 and 2, and is likely to have been introduced shortly after the facility started operation in 1969. This is likely true for both the source area in Area 1 and the source area in Area 2.

A review of the average groundwater flow velocity in the mass waste unit in Areas 1 and 2 at the site suggests the following:

K= hydraulic conductivity = geometric mean of slug test data = 851 ft/yr

I = hydraulic gradient = used in previous modeling = 0.003

N= Porosity = assumed to be approximately 0.28

V= average linear groundwater velocity = $K \cdot I \cdot N$ = 9.1 ft/yr

This calculation would suggest that TCE released in approximately 1969 should have migrated in groundwater of the mass waste unit sediments approximately 410 feet since that time (this calculation does not consider dispersion). However, a review of the data available from groundwater monitoring in the mass waste unit

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aquifer suggests that migration from the source areas is only a fraction of what it should be considering this groundwater velocity (this is particularly true if longitudinal dispersion processes were considered). As a result, site data appear to support the fact that contaminant retardation processes are at work to slow down the migration of contaminants.

Additionally, the IEPA, and Lockformer requests that retardation be considered during evaluations of the site remedial objectives.

10. *Page 10, 2nd bullet. Combining RBCA equation R14 and SSL procedures is not appropriate. 35 IAC 742.700(e)(3) states that, "combining equations from Appendix C, Tables A through C to form a new model is not allowed. In addition, Appendix C, Tables A through C must use their own applicable parameters identified in Appendix C, Table B and D, respectively."*

35 IAC 742.700(e)(3) refers specifically to Tier 2 soil evaluations. In accordance with 35 IAC 742.900(c)(1), modifications of parameters not allowed under a Tier 2 evaluation can be implemented within a Tier 3 evaluation, provided justification. It is Clayton's opinion that the combination of the RBCA equation "R14" and the SSL equation "S22" within a Tier 3 evaluation to determine the applicable leaching factors at the site is warranted. The justification for this opinion is discussed in detail within Clayton's response to Specific Comment #23.

11. *Page 10, 2nd paragraph, cis-1,2-dichloroethane and trans-1,2-dichloroethane have a cumulative effect on the circulatory system, not the central nervous system.*

The correction will be implemented in the revised modeling package.

12. *Page 10, last paragraph states, "However, since the cumulative effects of carcinogens need only be considered for groundwater in Tier 2 evaluations, and neither trichloroethene nor tetrachloroethene (using the existing RAOs as soil component of the GWRO) will coexist with each other or vinyl chloride at the downgradient property line (point of human exposure), weighted averages are not required." TACO does not allow the assumption that one or more compounds will not coexist at the property boundary. The Tier 2 groundwater objectives should be adjusted in accordance with 35 IAC 742.805(c) or (d) to ensure that the cumulative carcinogenic risk is less than 1 in 10,000.*

The assumption described in Specific Comment #12 was not applied to the cumulative effects evaluation. The locations at which compounds would coexist in groundwater were determined by groundwater transport modeling using RBCA equation "R26."

Given the modeling parameters, one can determine the distance that each compound would migrate before reaching the applicable GRO [which is the Tier 1 groundwater remediation objective for groundwater component of the groundwater ingestion route (Class 1 groundwater)].

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Based on the modeling results, no similar-acting compounds would be transported the distance necessary to coexist at the point of human exposure (the property line). Therefore, to consider cumulative risk in the absence of cumulative exposure seemed unnecessary. However, cumulative exposure to similar-acting compounds will be reevaluated in the revised modeling. If there is coexistence of similar-acting compounds at the point of human exposure, then the objectives will be adjusted in accordance with 35 IAC 742.805.

13. *Page 15, 1st paragraph states, "Additionally, SVE efforts are already taking place at the site targeted at removing contaminants in the unsaturated zone in the mass waste sand and gravel will likely desorb contamination from the lower till through volatilization." Page 16, 3rd bullet states that, "Contaminants sorbed into the interstitial matrix of the lower till are not expected to be mobile to any significant degree." How will the SVE system reduce the contamination in the till? These statements seem contradictory.*

The Illinois EPA did not need to look to the third bullet on page 16 to find the statement in question; it appears in the sentence immediately proceeding the quoted sentence starting with "Additionally, ..." on page 15 in the first paragraph. It is clear from a review of the first paragraph on page 15 that the statement "contaminants sorbed into the lower till interstitial matrix are not mobile to any significant degree" refers to the interstitial vertical migration of contaminants in pore water (or under saturated conditions) through the lower till to the lower sand and Silurian dolomite. This has been demonstrated through groundwater monitoring results indicating no verifiable detection of TCE in groundwater from any groundwater monitoring well completed in the lower sand and/or Silurian dolomite in Areas 1 and 2 at the Lockformer site (several of which are located immediately below elevated concentrations of site contaminants determined to be present in the upper surface of the lower till). Alternatively, operation of the SVE system to continuously exchange air pore volumes in the mass waste unit immediately above the unsaturated, upper surface of the lower till unit is expected to volatilize contamination from the lower till surface.

14. *Page 23, 2nd paragraph. Which other PRB installation/emplacement techniques were considered as part of this evaluation? Have the feasibility and cost implications of recent advancements been considered? Recent alternatives that can install PRBs to depths of 100 feet include deep trenching machines, high pressure jetting, extended backhoes, and hydraulic clamshells (discussed in In Situ Permeable Reactive Barriers: Application and Deployment Training Manual, EPA/542/B-00/01, January 2000).*

Lockformer has performed an extensive evaluation of the alternatives available for installation of a PRB in Area 2 at the Lockformer site. The conclusion of this evaluation is that the only consistently effective manner in which to install a PRB is through use of a specially designed deep trencher with attached box. This trencher is capable of installation down to only 27 feet in depth. As a result, terracing to install a PRB on the west side of Area 2 would be necessary.

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15. *Page 26, last two bullets. A review of the literature (Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater, EPA/600/R-98/128, September 1998) has shown that complete anaerobic degradation via reductive dechlorination occurs along the following pathway: PCE → TCE → cis-1,2-DCE → VC → ethene → ethane. Aerobic oxidation processes have been shown to act as follows: cis-1,2-DCE or VC → CO₂ + H₂O.*

Lockformer agrees; the reference in the first bullet to ethane (and not ethene) was a typographical error, and agrees the proper aerobic oxidation pathway results in mineralization of the alkenes. The only cautionary note provided here is that very little actual data exist to document the aerobic oxidation of cis-1,2-DCE.

16. *Page 28, 2nd paragraph. What does the current data indicate about the viability of an in situ biological treatment technique? What are the on-site and off-site dissolved oxygen levels and oxidation-reduction potentials? What are the dissolved methane, ethane, and ethene levels? Is there an anaerobic, reducing environment present to degrade the chlorinated solvents present in groundwater?*

Lockformer is currently evaluating additional bench-scale biological treatment studies. A report on this subject developed from site data will be presented in the March 5, 2004 report.

17. *Page 31, last paragraph. Add, "carbon substrates," before "microorganisms or nutrients."*

Lockformer agrees with this comment.

18. *TACO Calculation Package, Groundwater contours should be shown on Figures 1 through 7 to assure that the distances to the compliance location are measured in a downgradient direction.*

Groundwater contours will be included in the revised modeling package.

19. *TACO Calculation Package, The source dimensions to be used in TACO calculations depend on the direction of groundwater flow. S_w controls attenuation due to lateral dispersion and should be measured perpendicular to the direction of groundwater flow. W controls the effect of dilution at the source and should be measured in the direction of groundwater flow. The schematic on the attached figure shows the source dimensions to be used in TACO calculations. Please revise the source dimensions to reflect the groundwater flow direction.*

The source dimensions for the revised modeling will be realigned to better correspond with groundwater flow.

20. *TACO Calculation Package, Depending on the groundwater flow direction, the combined effect of several sources must be considered. For example, Figure 4 shows two sources with plumes that may overlap due to lateral dispersion.*

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In instances such as those depicted in Figure 4, the revised modeling will account for the potential of combined effects by adding contaminant concentrations (accounting for dispersion, etc.) from the upgradient source to the GW_{source} concentration of the downgradient source. The additional concentration added to the downgradient source will be determined using the RBCA equation "R26," considering the distance from downgradient limits of each source area.

21. *TACO Calculation Package, The infiltration rate used to develop the leaching factor should be 30 cm/yr (35 IAC Part 742, Appendix C, Table D), rather than 7 cm/yr.*

The 7 cm/year of infiltration (or recharge) was derived from the work by W.C. Walton, *Selected Analytical Methods for Well and Aquifer Evaluation*, 1962. This work was further reported in *Groundwater Resources of DuPage County, Illinois, Cooperative Groundwater Report 2*, by A.J. Zeisel, W.C. Walton, R.T. Sasman, and T.A. Prickett, 1962. The estimates of recharge presented in these publications were developed from an analysis of the recharge to the Silurian dolomite necessary to equilibrate the large withdrawals from production wells. This is one of the classic works in groundwater hydrology, and one of the only analytical methods available to estimate recharge. Based on these analyses, the average recharge in the eastern two-thirds of DuPage County was determined to be approximately 2.94 inches/year (7.46 cm/yr).

One thing made very clear by the semi-regional groundwater studies performed by Lockformer is that all the groundwater occurring within the upland till areas discharges to the Silurian dolomite. The Cooperative Report by Zeisel et al. stated this as well, "The glacial drift overlying the dolomite permits vertical movement of groundwater from the water table to the dolomite" and "...there is a good hydraulic connection between Silurian rocks and overlying glacial drift..." The results of Lockformer's studies over the semi-regional area suggest nearly all the groundwater occurring in the glacial sediments ultimately discharges to the Silurian dolomite. In the general vicinity of the Lockformer site, the discharge point for all the glacial drift groundwater is the Silurian dolomite. The lower till prohibits this direct discharge in Areas 1 and 2 of the site; however, at the southern end of Area 3, groundwater saturating the mass waste unit is in direct hydraulic connection with the Silurian dolomite. Except on the floodplain of the East Branch DuPage River, there is no other possible discharge point for groundwater occurring in the glacial drift.

The recharge analysis by Walton in 1962 applies to total recharge for the glacial uplands in the eastern two-thirds of DuPage County. Lockformer is located within this area and the infiltration rate of 7.46 cm/year is appropriate for the Lockformer site.

22. *TACO Calculation Package, The leaching factor depends on the specific properties of the chemical of concern (k_s , H') and the source area geometry (W). The leaching factor was developed for each chemical separately, but for only one*

TECHNICAL MEMORANDUM

(Continued)

source geometry. An explanation should be given as to why only one source geometry was used.

Source area geometry variables only affect the portion of the RBCA equation for the determination of Leaching Factors (LF_{sw}) (equation "R14") pertaining to dilution. Since the modeling incorporated a default dilution factor of 20 (in accordance with SSL guidance) in the determination of the leaching factors, the effects of source area geometry in the "R14" equation were no longer a variable.

The source area geometry presented in the modeling was randomly selected to satisfy requirements inherent to the TACO Plus! software used to perform the calculations. Justification for the use of the default dilution factor is discussed within the response to Specific Comment #23.

23. *TACO Calculation Package, A dilution factor of 20 was assumed in the calculation of the leaching factor. The leaching factor must be calculated using I , W , U_{gw} , d_{gw} since SSL and RBCA parameters cannot be combined.*

As discussed in the response to Specific Comment #10, although SSL and RBCA parameters cannot be combined within the confines of a Tier 2 evaluation, modifications of parameters not allowed under a Tier 2 evaluation can be implemented within a Tier 3 evaluation [35 IAC 742.900(c)(1)], provided the modifications are justified.

Leaching factors evaluations differ between the SSL and RBCA procedures. Within the SSL guidance, the user is allowed to select a default dilution factor in the determination of a leaching factor. The U.S. EPA selected 20 as the default dilution factor using a "weight of evidence" approach. This approach considered the results of the EPA's Office of Solid Waste's EPACMPT model, as well as results from applying the SSL dilution model to 300 groundwater sites across the United States. However, there is no similar provision in the RBCA procedure for substituting the dilution factor portion of equation "R14" with a value of 20.

Based on the site data collected to date, leaching factor (LF_{sw}) values calculated for the site using the unaltered RBCA equation "R14" predict corresponding groundwater concentrations much higher than actual data from the site. This observation is supported by soil/groundwater concentrations in several locations across the site but can be most obviously evaluated by the soil/groundwater relationship observed immediately west of the former parking lot near Clayton soil boring CSB-2017B and monitoring well MW-500D. VOC concentrations up to 3,400 mg/kg of TCE were identified in this area measuring approximately 30 feet wide by 30 feet long near CSB-2017B, immediately upgradient from monitoring well MW-500D. This allows a determination of the actual relationship between groundwater concentration at the downgradient edge of a source area (GW_{source}) and the soil concentrations in the source area (the same geometry used in a typical leaching factor evaluation). This relationship can then

TECHNICAL MEMORANDUM

(Continued)

be compared to the leaching factor predictions calculated by RBCA equation “R14” to evaluate the accuracy of the prediction.

Using the same physical soil properties and aquifer properties used in the July 25, 2003 modeling package, RBCA equation “R14” was used to determine the predicted leaching factor for TCE from the 30 feet by 30 feet source area with a TCE concentration of 1,500 mg/kg (a conservative estimate) to simulate the impacts identified near CSB-2017B. The equation predicted a groundwater concentration at the downgradient edge of a source area (near MW-500D) of 145 mg/L. The parameters used to determine the leaching factor (LF_{sw}) for this evaluation are presented in Datasheets RBCA XI and RBCA XIII located in Attachment M-3. GW_{source} concentrations were calculated by hand using RBCA equation “R12,” not included.

When the leaching factor was determined using a default dilution factor of 20 (in accordance with SSL guidance) within the RBCA equation “R14,” the predicted groundwater concentration at the downgradient edge of a source area was 59 mg/L. The parameters used to determine the leaching factor (LF_{sw}) for this evaluation are presented in Datasheets RBCA XI and RBCA XIII located in Attachment M-3. GW_{source} concentrations were calculated by hand using RBCA equation “R12,” not included.

Each of these predicted values is much higher than the TCE concentrations observed in the groundwater samples collected from MW-500D on either June 21, 2001 (1.69 mg/L) or October 3, 2002 (1.87 mg/L), indicating that both the unaltered RBCA equation “R14” and the modified equation predict a more aggressive transfer of contaminants from soil to groundwater than actually occurs at the site. However, since the leaching factor model incorporating the default dilution factor of 20 into the RBCA equation “R14” suggests site conditions that more accurately represent the actual site conditions (though still predicting a greater ability to leach than actual site conditions), it has been selected to predict the transfer of contaminants from soil to groundwater.

24. *TACO Calculation Package, The analytical results for organic carbon content and porosity should be included. The locations where the samples were collected should also be shown.*

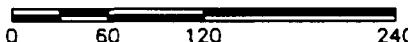
Table M-2 includes the physical soil data used in the TACO evaluation. Physical soil parameters calculated for the upper fill/till include organic carbon content (0.7%), bulk density (1.72 g/cm³), total porosity (38%), water-filled porosity (35%) and air-filled porosity (3%). These values were determined by calculating the average values for each of the samples collected from the upper till/fill.

Physical soil parameters calculated from the “aquifer” materials included only organic carbon content (0.8%). The value was determined by averaging all organic carbon concentrations for samples collected from the lower half of the mass waste sand and gravel.

652.4

MW-1605
652.35

SCALE IN FEET



0 60 120 240

POTENTIOMETRIC SURFACE MAP OF THE
MASS WASTE UNIT GLACIAL SEDIMENTS
ON NOVEMBER 8, 2002
THE LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS

FIGURE

2.1-8

CSB1807
661.8

001
AREA 1

660

27
26

VE-42
662.28

VE-43
659.29

VE-44
659.77

CSB1809
663.8

CSB1808
662.2

CSB1838
657.78

VE-45
662.37

VE-46
661.1

VE-47
657.82

GATE

CSB1810
659.87

CSB1908
653.01

VE-48
659.51

SITE BOUNDARY

ELM

SCALE IN FEET
0 25 50 100

MW-1101D
649.7

MW-1100D
651.4

3CP
2-13-04
AS SHOWN
526360012D
5263.60

ELEVATION OF THE
LOWER TILL SURFACE

THE LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS



FIGURE

M-1

AREA 1

660

659

GATE

SITE BOUNDARY

658

ELM AVENUE

SCALE IN FEET
0 25 50 100

MW-1101S
657.72

MW-1100S
658.09

BCP
2-13-04
AS SHOWN
6526360012E
65263.60

STATIC WATERS IN MONITORING WELLS
COMPLETED IN THE MASS WASTE SAND & GRAVEL
ON OCTOBER 17, 2001
THE LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS



FIGURE

M-2



TABLE M-1

SUMMARY OF HYDRAULIC CONDUCTIVITY DATA

Table M-1. Summary of Hydraulic Conductivity Data in Areas 1 & 2

**Summary of Horizontal Hydraulic Conductivity Results Perfomed by
Slug Test Method (in centimeters/second)**

MASS WASTE SAND AND GRAVEL UNIT			
Well Location	Bower and Rice		
	Well Average K	Falling Head	Rising Head
MW-521	2.12E-02	8.06E-03	3.44E-02
MW-522	1.34E-05	no data	1.34E-05
MW-1100S	4.02E-04	5.31E-04	2.72E-04
MW-1101S	6.19E-04	7.35E-04	5.03E-04
MW-1102S	7.61E-04	7.61E-04	no data
MW-1103S	2.80E-03	9.30E-04	4.67E-03
MW-1109	1.70E-03	1.66E-03	1.74E-03
MW-1117	9.08E-04	1.26E-03	5.55E-04
Geomean	8.33E-04		

LOWER CLAYEY SILT TILL UNIT			
Well Location	Bower and Rice		
	Well Average K	Falling Head	Rising Head
MW-1122S	1.52E-05	no data	1.52E-05

LOWER SAND UNIT			
Well Location	Bower and Rice		
	Well Average K	Falling Head	Rising Head
MW-1114S	4.84E-03	5.83E-03	3.85E-03

**Vertical Permeability of the Lower Clayey Silt Till Unit
Performed by Triaxial Chamber and Back Pressure Saturation**

Well Location	Shelby Tube Triaxial Permeability - ASTM D 2937 (in cm/sec)		
	Ave.Triaxial Perm.	41 to 43 feet	46 to 48 feet
MW-1122S	2.92E-07	2.56E-07	3.27E-07



TABLE M-2

LITHOLOGIC GEOTECHNICAL ANALYSES

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1000		CSB-1001		CSB-1002		CSB-1203	
	48-50 ft	36-38 ft	42-44 ft	42-48 ft	54-56 ft	43 ft	46 ft	53 ft
Non-Carbonate Organic Carbon (%)	3.78	*5.83	0.66	2.29	0.663	*0.1805	0.9225	0.669
Grain Size (USCS)	NA	NA	NA	NA	NA	Sandy Gravel, Little Silt, GP-GM	Silty Clay, Trace Sand, Trace Gravel, CL	Silty Clay, Trace Sand, CL
Lithologic Unit	Lower Sand	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand	Lower Till	Lower Till
Moisture Content (%)	NA	NA	NA	NA	NA	NA	18.3	17.9
Specific Gravity	NA	NA	NA	NA	NA	2.70	2.75	2.75
Bulk Density (pounds/ft ³) (dry)	NA	NA	NA	NA	NA	NA	111.8	112.7
Total Porosity (%)	NA	NA	NA	NA	NA	NA	0.35	0.34
Air-filled Porosity (%)	NA	NA	NA	NA	NA	NA	0.02	0.02
Water-filled Porosity (%)	NA	NA	NA	NA	NA	NA	0.33	0.32

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1204							
	5 ft	25 ft	33 ft	46 ft	50 ft	54 ft	56 ft	70 ft
Non-Carbonate Organic Carbon (%)	0.7725	0.8055	0.376	*0.283	0.872	0.8825	0.243	0.0979
Grain Size (USCS)	Silty Clay, Some Sand, Trace Gravel, CL	Silty Clay, Little Sand, Trace Gravel, CL	Sand, Some Gravel, Little Silt, SW-SM	Sandy Gravel, Trace Silt, Trace Clay, GW-GM	Silty Clay, Trace Sand, Trace Gravel, CL	Silty Clay, Trace Sand, CL	Silty Clay, Some Sand, Trace Gravel, CL	Silty Clay, Some Sand, Trace Gravel, CL
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand
Moisture Content (%)	27.8	21.4	NA	NA	21.7	22.8	11.4	15.3
Specific Gravity	2.75	2.75	2.70	2.70	2.75	2.75	2.79	2.79
Bulk Density (pounds/ft ³) (dry)	95	106.1	NA	NA	106.0	103	129.1	119.2
Total Porosity (%)	0.45	0.38	NA	NA	0.38	0.40	0.26	0.31
Air-filled Porosity (%)	0.02	0.02	NA	NA	0.01	0.02	0.02	0.02
Water-filled Porosity (%)	0.42	0.36	NA	NA	0.37	0.38	0.24	0.29

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1205							
	5 ft	26 ft	32 ft	45 ft	49 ft	54 ft	60 ft	73 ft
Non-Carbonate Organic Carbon (%)	0.544	0.812	0.268	*0.2635	0.5115	0.8635	0.1835	0.0772
Grain Size (USCS)	Silty Clay, Some Sand, Trace Gravel, CL	Silty Clay, Little Sand, Trace Gravel, CL	Sand, Some Gravel, Little Silt, SP-SM	Gravelly Sand, Little Silt, SW-SM	Silty Clay, Some Sand, CL	Silty Clay, Trace Sand, CL	Silty Clay, Some Sand, Little Gravel, CL	Sand, Little Silt, SP-SM
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand
Moisture Content (%)	22.0	22.6	NA	NA	14.3	20.8	8.6	NA
Specific Gravity	2.79	2.75	2.70	2.70	2.79	2.75	2.79	2.70
Bulk Density (pounds/ft ³) (dry)	102.6	103.6	121.7	NA	121.7	106.3	137.7	NA
Total Porosity (%)	0.41	0.40	NA	NA	0.30	0.38	0.21	NA
Air-filled Porosity (%)	0.05	0.02	NA	NA	0.02	0.03	0.02	NA
Water-filled Porosity (%)	0.36	0.38	NA	NA	0.28	0.35	0.19	NA

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION								
	CSB-1206								
	3 ft	33 ft	36 ft	47 ft	49 ft	53 ft	56 ft	59 ft	75 ft
Non-Carbonate Organic Carbon (%)	0.5505	0.8435	0.2545	*0.212	0.6325	0.825	0.688	0.172	0.0854
Grain Size (USCS)	Silty Clay, Little Sand, Trace Gravel, CL	Silty Clay, Little Sand, Trace Gravel, CL	Gravelly Sand, Little Silt, SW-SM	Sand, Trace Gravel, Some Silt, SM	Silty Clay, Trace Sand, CL	Silty Clay, Trace Sand, CL	Silty Clay, Trace Sand, CL	Silty Clay, Some Sand, Trace Gravel, CL	Clayey Sand, Trace Gravel, SC
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand	Lower Sand
Moisture Content (%)	20.0	22.5	NA	NA	18.1	19.1	22.9	10.5	16.1
Specific Gravity	2.75	2.75	2.70	2.70	2.75	2.75	2.75	2.79	2.78
Bulk Density (pounds/ft ³) (dry)	108.1	103.9	NA	NA	112.5	110.5	103.6	131.9	109.1
Total Porosity (%)	0.37	0.39	NA	NA	0.34	0.36	0.40	0.24	0.37
Air-filled Porosity (%)	0.02	0.02	NA	NA	0.02	0.02	0.02	0.02	0.09
Water-filled Porosity (%)	0.35	0.37	NA	NA	0.33	0.34	0.38	0.22	0.28

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1207							
	3 ft	33 ft	36 ft	47 ft	51 ft	64 ft	67 ft	75 ft
Non-Carbonate Organic Carbon (%)	0.472	0.827	0.143	*0.27	0.84	0.22	0.06	0.10
Grain Size (USCS)	Silty Clay, Some Sand, Trace Gravel, CL	Silty Clay, Little Sand, Trace Gravel, CL	Gravel, Some Sand, Little Silt, GW-GM	Sand, Little Gravel, Some Silt, SM	Silty Clay, Some Sand, Trace Sand, CL	Silty Clay, Some Sand, Trace Gravel, CL	Silty Sand, Trace Clay, SM	Clayey Sand, SM
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand
Moisture Content (%)	18.3	17.3	NA	NA	19.0	15.0	15.3	17.1
Specific Gravity	2.79	2.79	2.70	2.70	2.75	2.79	2.78	2.78
Bulk Density (pounds/ft ³) (dry)	112.7	114.9	NA	NA	110	119.9	116.4	110.3
Total Porosity (%)	0.35	0.34	NA	NA	0.36	0.31	0.33	0.36
Air-filled Porosity (%)	0.02	0.02	NA	NA	0.02	0.02	0.04	0.06
Water-filled Porosity (%)	0.33	0.32	NA	NA	0.33	0.29	0.29	0.30

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1208							
	5 ft	28 ft	32 ft	44 ft	47 ft	52 ft	57 ft	71 ft
Non-Carbonate Organic Carbon (%)	0.89	0.82	0.35	*0.27	0.57	0.89	0.17	0.21
Grain Size (USCS)	Silty Clay, Little Sand, Trace Gravel, CL	Silty Clay, Little Sand, Trace Gravel, CL	Sandy Gravel, Little Silt, GW-GM	Sand, Some Gravel, Trace Silt, SP	Silty Clay, Some Sand, Some Gravel, CL	Silty Clay, Trace Sand, CL	Clayey Sand, Some Gravel, SC	Silty Clay, Little Sand, Trace Gravel, CL
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand
Moisture Content (%)	24.5	18.9	NA	NA	17.9	22.4	10.9	13.4
Specific Gravity	2.75	2.75	2.70	2.70	2.78	2.75	2.78	2.79
Bulk Density (pounds/ft ³) (dry)	99.7	110.3	NA	NA	111.1	103.8	130.6	123.8
Total Porosity (%)	0.42	0.36	NA	NA	0.36	0.40	0.25	0.29
Air-filled Porosity (%)	0.03	0.02	NA	NA	0.04	0.02	0.02	0.02
Water-filled Porosity (%)	0.39	0.33	NA	NA	0.32	0.37	0.23	0.27

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1209							
	3 ft	29 ft	33 ft	44 ft	46 ft	52 ft	57 ft	70 ft
Non-Carbonate Organic Carbon (%)	0.28	0.81	0.32	*0.32	0.86	0.84	0.23	0.08
Grain Size (USCS)	Silty Clay, Little Sand, Little Gravel, CL	Silty Clay, Little Sand, Trace Gravel, CL	Sand, Some Gravel, Little Silt, SP-SM	Gravelly Sand, Little Silt, SW-SM	Silty Clay, Trace Sand, CL	Silty Clay, Trace Sand, CL	Silty Clay, Some Sand, Little Gravel, CL	Silt and Sand, ML
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand
Moisture Content (%)	19.7	21.8	NA	NA	21.0	21.9	13.9	17.5
Specific Gravity	2.79	2.75	2.70	2.70	2.75	2.75	2.79	2.79
Bulk Density (pounds/ft ³) (dry)	106.7	105.4	NA	NA	106.6	104.8	122.6	108.9
Total Porosity (%)	0.39	0.39	NA	NA	0.38	0.39	0.30	0.37
Air-filled Porosity (%)	0.05	0.02	NA	NA	0.02	0.02	0.02	0.07
Water-filled Porosity (%)	0.34	0.37	NA	NA	0.36	0.37	0.27	0.31

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	CSB-1210							
	3 ft	28 ft	31 ft	45 ft	46 ft	54 ft	57 ft	69 ft
Non-Carbonate Organic Carbon (%)	0.48	0.83	0.24	*0.31	0.85	0.91	0.45	0.09
Grain Size (USCS)	Silty Clay, Little Sand, Trace Gravel, CL	Silty Clay, Some Sand, Trace Gravel, CL	Sand, Some Gravel, Some Silt, SM	Sand, Some Gravel, Little Silt, SP-SM	Silty Clay, Trace Sand, Trace Gravel, CL	Silty Clay, Trace Sand, CL	Silty Clay, Some Sand, Little Gravel, CL	Sand, Some Silt, SC
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Sand	Lower Sand
Moisture Content (%)	18.3	16.5	NA	NA	20.7	20.5	12.0	NA
Specific Gravity	2.79	2.79	2.70	2.70	2.75	2.75	2.79	2.70
Bulk Density (pounds/ft ³) (dry)	112.3	117.1	NA	NA	107	107.4	127.7	NA
Total Porosity (%)	0.35	0.33	NA	NA	0.38	0.37	0.27	NA
Air-filled Porosity (%)	0.03	0.02	NA	NA	0.02	0.02	0.02	NA
Water-filled Porosity (%)	0.33	0.31	NA	NA	0.36	0.35	0.25	NA

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.

TABLE M-2
Lithologic Geotechnical Analysis

The Lockformer Company / Lisle, Illinois

COMPOUNDS	SAMPLE LOCATION							
	MW-1108S							
	4 ft	32 ft	35 ft	45 ft	49 ft	55 ft	60 ft	75 ft
Non-Carbonate Organic Carbon (%)	0.57	0.82	0.10	*0.33	0.74	0.93	0.23	0.13
Grain Size (USCS)	Silty Clay, Little Sand, Trace Gravel, CL	Silty Clay, Some Sand, Trace Gravel, CL	Sand, Little Gravel, Some Silt, SM	Sandy Gravel, Little Silt, GP-GM	Silty Clay, Trace Sand, CL	Silty Clay, Trace Sand, CL	Silty Clay, Some Sand, Some Gravel, CL	Sand, Trace Silt, SP
Lithologic Unit	Upper Till/Fill	Upper Till/Fill	Mass Waste	Mass Waste	Lower Till	Lower Till	Lower Till	Lower Sand
Moisture Content (%)	22.7	17.0	NA	NA	19.3	18.9	12.5	NA
Specific Gravity	2.75	2.79	2.70	2.70	2.75	2.75	2.78	2.70
Bulk Density (pounds/ft ³) (dry)	103.4	115.2	NA	NA	110	109.5	126.4	NA
Total Porosity (%)	0.40	0.34	NA	NA	0.36	0.36	0.27	NA
Air-filled Porosity (%)	0.02	0.02	NA	NA	0.02	0.03	0.02	NA
Water-filled Porosity (%)	0.38	0.31	NA	NA	0.34	0.33	0.25	NA

NOTES: NA = Not Analyzed

* included into the organic carbon calculation for the aquifer materials.



ATTACHMENT M-1

BORING LOGS CSB-1851 AND CSB-1852

BORING NO: CSB1851	PROJECT NO: 15-65263.03-001	PROJECT NAME: Lockformer Lisle, IL						
BORING LOCATION: Ogden Corporate Center			COORDINATES: N: 1870289.8 E: 1057232.2					
DRILLING CO: Mid-America Drilling			DRILLER: J. Zils					
DRILLING EQUIP: Bobcat Geoprobe			BOREHOLE DIA: 2"					
START DATE: 6/7/2003	FINISH DATE: 6/7/2003			LOGGED BY: D. Lamsma				
START TIME (hours): 0835	FINISH TIME (hours): 0939			CHECKED BY:				
DEPTH ft m	DESCRIPTION	GRAPHIC	SAMPLES			PID		REMARKS
			NUMBER	RECOVERY	METHOD	MOISTURE	BLOW CNT (6")	
0 ft 0 m	ASPHALT							Elev: 684.0 ft
2	FILL Gravel, gray, moist		2/2	HPU	M		0	0.9
4	SILTY CLAY (CL) Dark brown, moist, some medium to coarse sand, stiff		2/2	HPU	M		0	1.8
6	SAND (SP) Brown, moist, fine to medium grained		2/2	HPU	M		0	1
8	SILT (ML) Light brown, moist, trace fine sand and clay, soft		2/2	HPU	M		0	1.4
10	SAND (SW) Brown, moist, fine to coarse grained, trace gravel		1/2	HPU	M		0	0.6
12	SAND AND GRAVEL (GW) Brown, moist, fine to coarse sand, gravel up to 2", some silt and clay		1/2	HPU	M		0	1.4
14			2/2	HPU	M		0	0.5
16			2/21/2	HPU	M		0	1
18			1/2	HPU	M		0	2.8
20			1/2	HPU	M		0	VOCs 2.1

BORING NO: CSB1851		PROJECT NO: 15-65263.03-001		PROJECT NAME: Lockformer Lisle, IL					
DEPTH	DESCRIPTION	GRAPHIC	SAMPLES			PID		REMARKS	
			NUMBER	RECOVERY	METHOD	MOISTURE	BLOW CNT (6")		
22	SANDY SILT (ML) Gray, moist, soft		1.5/2	HPU	M		0	0.3	VOCs
24	SAND (SP) Brown, moist, fine to medium grained, some silt		1.5/2	HPU	M		0	0.3	
26			1.5/2	HPU	M		0	1.8	
28	SILTY SAND (SM) Gray, wet, soft		2/2	HPU	W		--	--	
30	Sand seam, fine to medium grained from 30.0 to 30.2 feet		2/2	HPU	W		--	--	
32	End of Boring at 32.0 Feet								
34									
36									
38									
40									



BORING NO: CSB1852	PROJECT NO: 15-65263.03-001	PROJECT NAME: Lockformer Lisle, IL						
BORING LOCATION: Ogden Corporate Center			COORDINATES: N: 1870334.2 E: 1057223.5					
DRILLING CO: Mid-America Drilling			DRILLER: J. Zils					
DRILLING EQUIP: Bobcat Geoprobe			BOREHOLE DIA: 2"					
START DATE: 6/7/2003		FINISH DATE: 6/7/2003			LOGGED BY: D. Lamsma			
START TIME (hours): 1017		FINISH TIME (hours): 1137			CHECKED BY:			
DEPTH ft m	DESCRIPTION	GRAPHIC	SAMPLES			PID		REMARKS
			NUMBER	RECOVERY	METHOD	MOISTURE	BLOW CNT (6")	
0 0	ASPHALT							Elev: 684.1 ft
2 0	FILL Gravel, gray, moist		2/2	HPU	M		0 1.6	
4 0	SILTY CLAY (CL) Dark brown, moist, some medium to coarse sand, trace gravel, stiff		2/2	HPU	M		0 2	
6 0			2/2	HPU	M		0 1.7	
8 0	SAND (SW) Brown, moist, fine to coarse grained, trace gravel		2/2	HPU	M		0 2	
10 0	SILTY SAND (SM) Brown, moist, some clay, soft		1/2	HPU	M		0 3.4	
12 0	SAND AND GRAVEL (GW) Brown, moist, fine to coarse sand, gravel up to 2", some silt and clay		1/2	HPU	M		0 3.3	
14 0			1.5/2	HPU	M		0 2.7	
16 0	Less gravel from 15.0 to 16.5 feet		1.5/2	HPU	M		0 2.9	
18 0	SAND (SW) Brown, moist, fine to coarse grained, trace silt and gravel		2/2	HPU	M		0 4.1	VOCs
20 0			2/2	HPU	M		0 3.6	

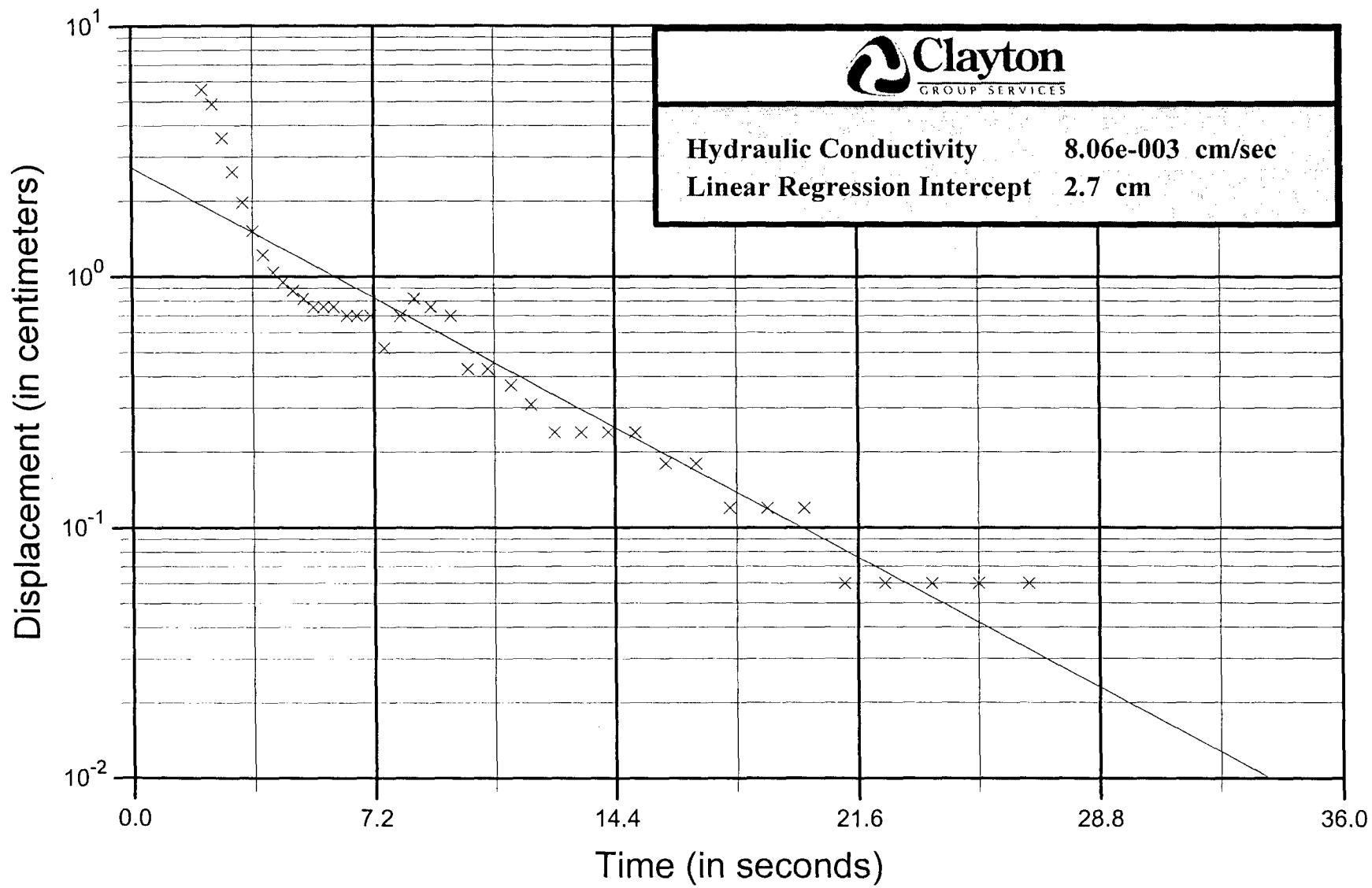
BORING NO: CSB1852		PROJECT NO: 15-65263.03-001		PROJECT NAME: Lockformer Lisle, IL					
DEPTH	DESCRIPTION	GRAPHIC	SAMPLES			PID		REMARKS	
			NUMBER	RECOVERY	METHOD	MOISTURE	BLOW CNT (6")		
22	SAND AND GRAVEL (GW) Brown, moist, fine to coarse sand, gravel up to 2", some silt and clay		1.5/2	HPU	M		0	1.7	VOCs GW
22	SAND (SP) Brown, moist, fine to medium grained, some silt		1.5/2	HPU	M		0	0.7	
24			2/2	HPU	M		0.1	4	
26			2/2	HPU	M/VM		0.1	3.7	
28	CLAYEY SILT (ML) Gray, very moist, very soft		1.5/2	HPU	VM		--	--	
30			1.5/2	HPU	VM		--	--	
32	SILTY SAND (SM) Gray, wet, fine to coarse sand, some clay, very soft		2/2	HPU	VM		--	--	
34			2/2	HPU	W		--	--	
36	End of Boring at 36.0 Feet								
38									
40									



ATTACHMENT M-2

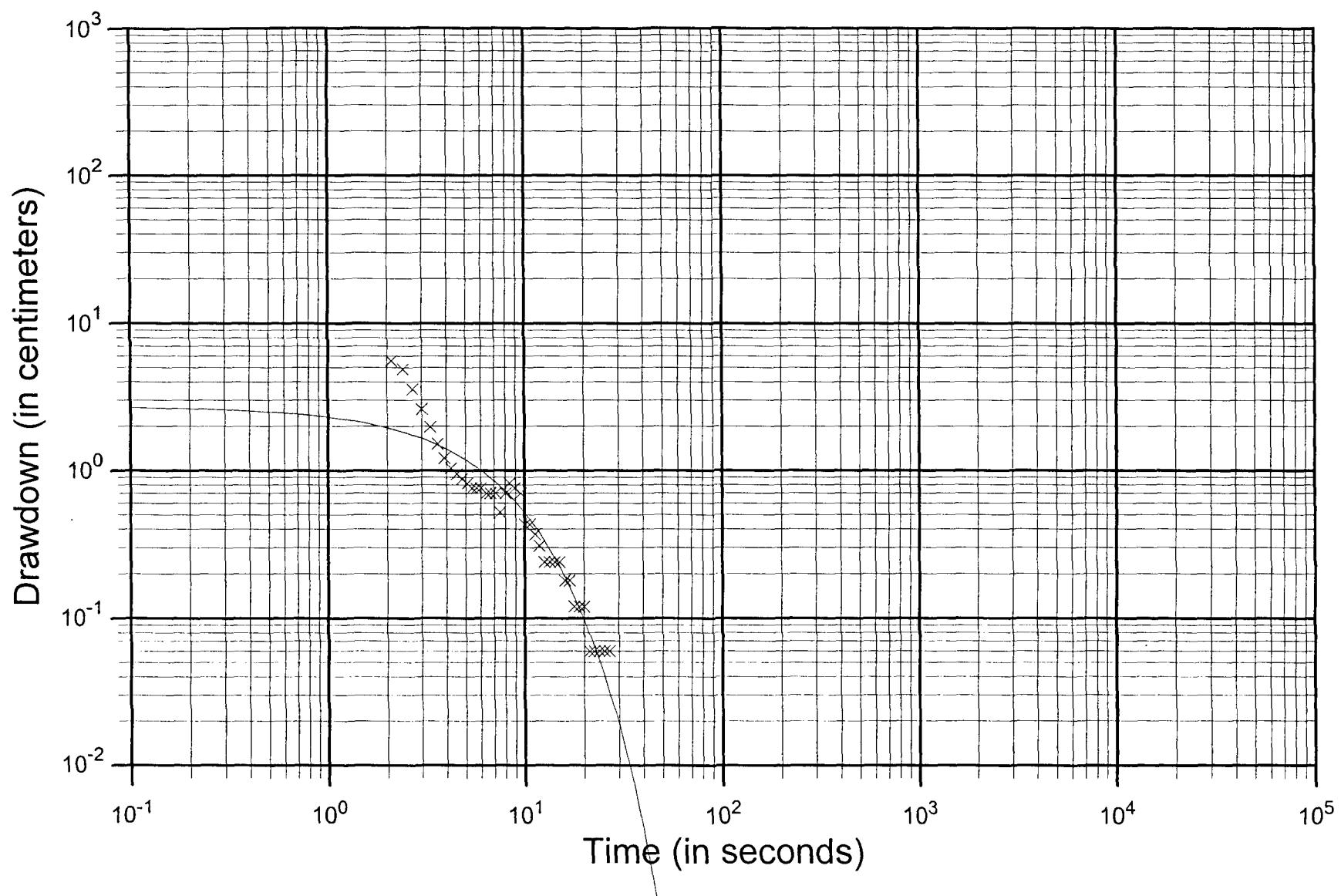
SLUG TEST DATA

MW521 Falling Head Slug Test

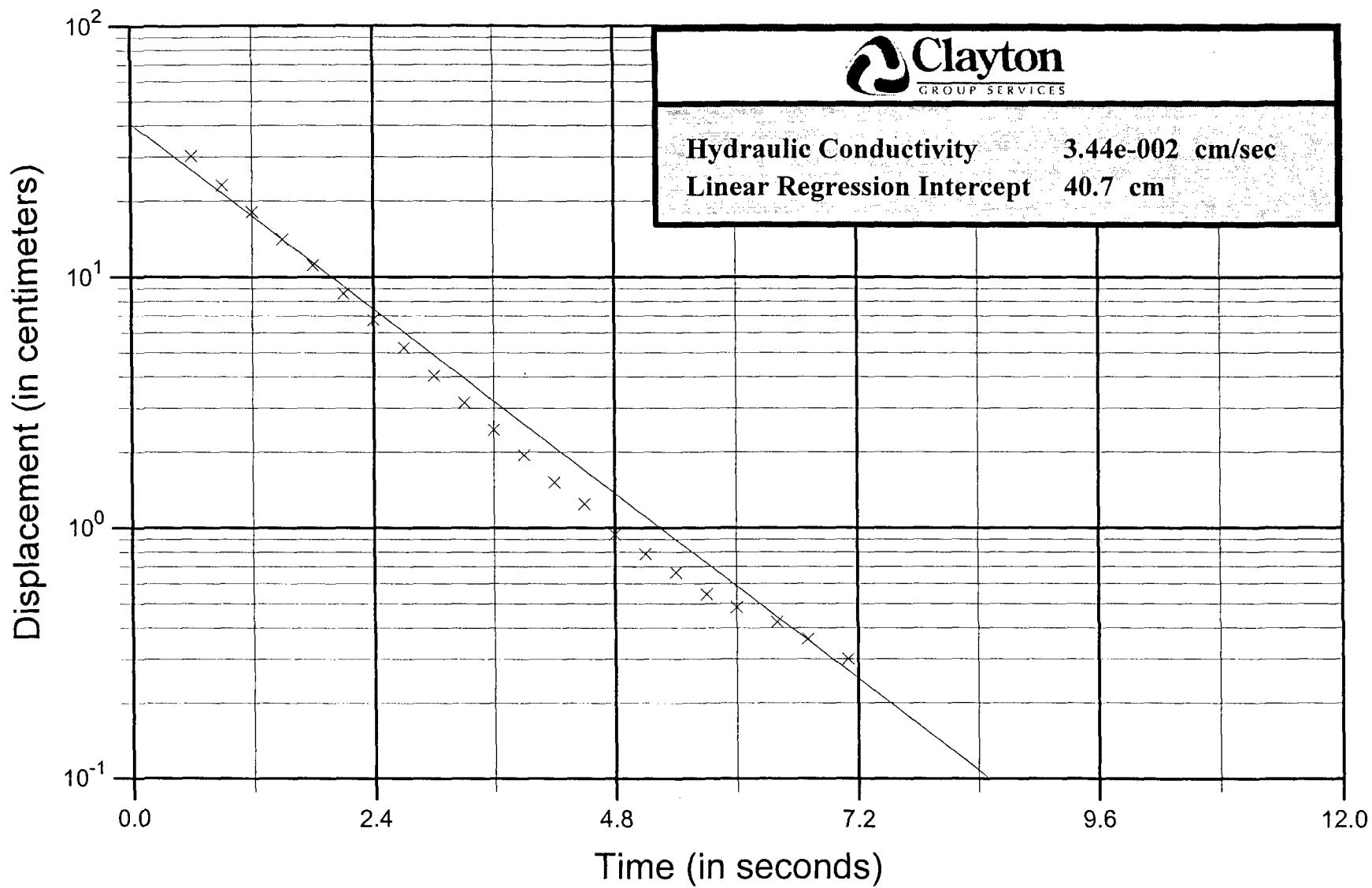


Bouwer and Rice Method (1976)

MW521 FH (Plot vs. Predicted Curve)

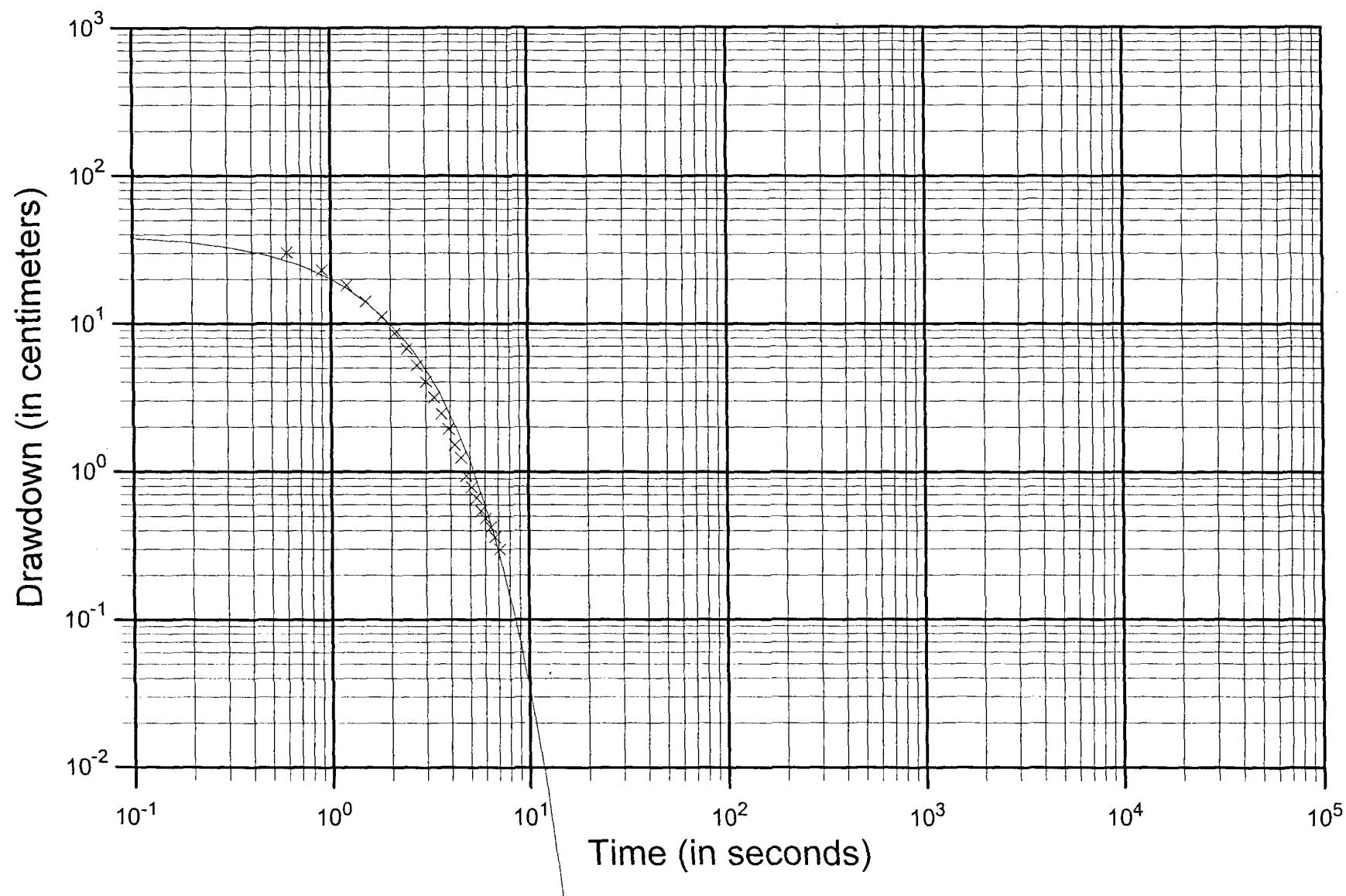


MW521 Rising Head Slug Test

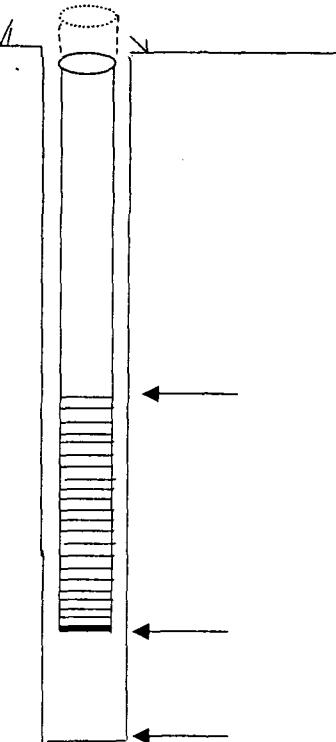


Bouwer and Rice Method (1976)

MW522 RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION								
Project Name	Lockformer			Well ID	MW-521			
Project No.	15-65263.10-001			Test Date	5/29/2004			
Field Personnel	D. Lamsma, K. Woloszyn				Unconfined			
EQUIPMENT INFORMATION					ILLUSTRATION OF INFORMATION			
Data Logger Type / Model No.	In-Situ							
Transducer Type / Model No.	Minitroll #5914							
Slug Length / Volume	3 feet / 0.28 gallons							
GENERAL INFORMATION								
Static Groundwater Elevation	656.44 ft MSL							
Ground Surface Elevation	705.9 ft MSL							
Top of Casing Elevation	709.11 ft MSL							
Well Stick-up	3.21	ft	97.8	cm				
Depth to Water	52.67	ft	1605.4	cm				
Diameter of Well Casing	2	in	5.1	cm				
Diameter of Borehole at Screen	6	in	15.2	cm				
Screen Interval	50.0 - 60.0	ft BG	1524 - 1829	cm BG				
Screen Length	10	ft	304.8	cm				
Base of Boring	60	ft BG	1828.8	cm BG				
Base of Upper Confining Unit	---	ft BG	0.0	cm BG				
Top of Lower Confining Unit	---	ft BG	0.0	cm BG				
Saturated Thickness (b)	10.66	ft	324.9	cm				
Static Height of Water in Well	10.66	ft	324.9	cm				
Geology of Aquifer	Sand							
SLUG TEST MEASUREMENT INFORMATION								
Parameter	Falling Head			Rising Head				
Initial Water Level Above Transducer	9	ft	274.32	cm	9	ft	274.32	cm
Initial Drawdown/Recovery	0.18	ft	5.61	cm	0.97	ft	29.47	cm
SLUG TEST RESULTS								
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units			
<p>Notes:</p> <hr/> <hr/> <hr/>								

SLUG TEST DATA FORM

In-Situ Inc. MiniTroll Pro
 Report generated: 5/30/2003 13:58:53
 Report from file: ...\\SN05914 2003-05-30 111008 MW521 FH.bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL
 Test name: MW521 FH
 Test defined on: 5/30/2003 11:09:42
 Test started on: 5/30/2003 11:10:08
 Test stopped on: 5/30/2003 11:12:07
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 73
 TOTAL DATA SAMPLES 73
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: Surface
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 7.067 Feet H2O

Values oscillate, are negative, and there is
not much displacement

Slug Size: 3 ft x 1.5 in
Depth to water (bgs)=52.42'
Screen length (amount exposed to aquifer)=7.58'
Aquifer thickness=7.58'
Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/30/2003	11:10:08	0	53.82	0	-2.1	0.00		
5/30/2003	11:10:08	0.3	53.84	-0.195	-1.8	-5.94		
5/30/2003	11:10:08	0.6	53.87	0.661	-1.5	20.15		
5/30/2003	11:10:08	0.9	53.87	-0.193	-1.2	-5.88		
5/30/2003	11:10:09	1.2	53.87	0.122	-0.9	3.72		
5/30/2003	11:10:09	1.5	53.87	-1.704	-0.6	-51.94		

Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/30/2003	11:10:09	1.8	53.87	-0.772	-0.3	-23.53
5/30/2003	11:10:10	2.1	53.87	-0.649	0.0	-19.78
5/30/2003	11:10:10	2.4	53.87	-0.672	0.3	-20.48
5/30/2003	11:10:10	2.7	53.89	-0.715	0.6	-21.79
5/30/2003	11:10:11	3	53.89	-0.746	0.9	-22.74
5/30/2003	11:10:11	3.3	53.89	-0.767	1.2	-23.38
5/30/2003	11:10:11	3.6	53.89	-0.782	1.5	-23.84
5/30/2003	11:10:11	3.9	53.89	-0.792	1.8	-24.14
5/30/2003	11:10:12	4.2	53.89	-0.798	2.1	-24.32
5/30/2003	11:10:12	4.5	53.89	-0.801	2.4	-24.41
5/30/2003	11:10:12	4.8	53.89	-0.803	2.7	-24.48
5/30/2003	11:10:13	5.1	53.89	-0.805	3.0	-24.54
5/30/2003	11:10:13	5.4	53.89	-0.807	3.3	-24.60
5/30/2003	11:10:13	5.7	53.89	-0.807	3.6	-24.60
5/30/2003	11:10:14	6	53.89	-0.807	3.9	-24.60
5/30/2003	11:10:14	6.4	53.89	-0.809	4.3	-24.66
5/30/2003	11:10:14	6.7	53.89	-0.809	4.6	-24.66
5/30/2003	11:10:15	7.1	53.89	-0.809	5.0	-24.66
5/30/2003	11:10:15	7.5	53.89	-0.815	5.4	-24.84
5/30/2003	11:10:16	8	53.89	-0.809	5.9	-24.66
5/30/2003	11:10:16	8.4	53.89	-0.805	6.3	-24.54
5/30/2003	11:10:17	8.9	53.89	-0.807	6.8	-24.60
5/30/2003	11:10:17	9.5	53.89	-0.809	7.4	-24.66
5/30/2003	11:10:18	10	53.87	-0.818	7.9	-24.93
5/30/2003	11:10:18	10.6	53.87	-0.818	8.5	-24.93
5/30/2003	11:10:19	11.3	53.87	-0.82	9.2	-24.99
5/30/2003	11:10:20	11.9	53.87	-0.822	9.8	-25.05
5/30/2003	11:10:20	12.6	53.87	-0.824	10.5	-25.12
5/30/2003	11:10:21	13.4	53.87	-0.824	11.3	-25.12
5/30/2003	11:10:22	14.2	53.87	-0.824	12.1	-25.12
5/30/2003	11:10:23	15	53.87	-0.824	12.9	-25.12
5/30/2003	11:10:23	15.9	53.87	-0.826	13.8	-25.18
5/30/2003	11:10:24	16.8	53.87	-0.826	14.7	-25.18
5/30/2003	11:10:25	17.8	53.87	-0.828	15.7	-25.24
5/30/2003	11:10:26	18.9	53.87	-0.828	16.8	-25.24
5/30/2003	11:10:28	20	53.84	-0.828	17.9	-25.24
5/30/2003	11:10:29	21.2	53.84	-0.83	19.1	-25.30
5/30/2003	11:10:30	22.4	53.87	-0.83	20.3	-25.30
5/30/2003	11:10:31	23.8	53.84	-0.83	21.7	-25.30
5/30/2003	11:10:33	25.2	53.87	-0.83	23.1	-25.30
5/30/2003	11:10:34	26.7	53.84	-0.83	24.6	-25.30
5/30/2003	11:10:36	28.2	53.84	-0.832	26.1	-25.36
5/30/2003	11:10:37	29.8	53.84	-0.832	27.7	-25.36
5/30/2003	11:10:39	31.5	53.84	-0.832	29.4	-25.36
5/30/2003	11:10:41	33.3	53.84	-0.832	31.2	-25.36
5/30/2003	11:10:43	35.2	53.84	-0.832	33.1	-25.36
5/30/2003	11:10:45	37.3	53.84	-0.834	35.2	-25.42
5/30/2003	11:10:47	39.5	53.84	-0.832	37.4	-25.36
5/30/2003	11:10:49	41.8	53.84	-0.832	39.7	-25.36

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/30/2003	11:10:52	44.3	53.84	-0.832	42.2	-25.36
5/30/2003	11:10:54	46.9	53.84	-0.834	44.8	-25.42
5/30/2003	11:10:57	49.7	53.84	-0.832	47.6	-25.36
5/30/2003	11:11:00	52.6	53.84	-0.834	50.5	-25.42
5/30/2003	11:11:03	55.7	53.84	-0.834	53.6	-25.42
5/30/2003	11:11:07	59	53.82	-0.831	56.9	-25.33
5/30/2003	11:11:10	62.5	53.82	-0.831	60.4	-25.33
5/30/2003	11:11:14	66.2	53.82	-0.831	64.1	-25.33
5/30/2003	11:11:18	70.1	53.82	-0.831	68.0	-25.33
5/30/2003	11:11:22	74.3	53.82	-0.833	72.2	-25.39
5/30/2003	11:11:26	78.7	53.82	-0.833	76.6	-25.39
5/30/2003	11:11:31	83.4	53.82	-0.833	81.3	-25.39
5/30/2003	11:11:36	88.4	53.8	-0.833	86.3	-25.39
5/30/2003	11:11:41	93.7	53.8	-0.833	91.6	-25.39
5/30/2003	11:11:47	99.3	53.8	-0.833	97.2	-25.39
5/30/2003	11:11:53	105.2	53.8	-0.833	103.1	-25.39
5/30/2003	11:11:59	111.5	53.8	-0.833	109.4	-25.39
5/30/2003	11:12:06	118.1	53.8	-0.833	116.0	-25.39

2.1	5.58
2.4	4.88
2.7	3.57
3	2.62
3.3	1.98
3.6	1.52
3.9	1.22
4.2	1.04
4.5	0.95
4.8	0.88
5.1	0.82
5.4	0.76
5.7	0.76
6	0.76
6.4	0.70
6.7	0.70
7.1	0.70
7.5	0.52
8	0.70
8.4	0.82
8.9	0.76
9.5	0.70
10	0.43
10.6	0.43
11.3	0.37
11.9	0.31
12.6	0.24
13.4	0.24
14.2	0.24
15	0.24
15.9	0.18
16.8	0.18
17.8	0.12
18.9	0.12
20	0.12
21.2	0.06
22.4	0.06
23.8	0.06
25.2	0.06
26.7	0.06
28.2	0.00
29.8	0.00
31.5	0.00
33.3	0.00
35.2	0.00

In-Situ Inc. MiniTroll Pro
 Report generated: 5/30/2003 13:59:51
 Report from file: ...\\SN05914 2003-05-30 111347 MW521 RH.bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL
 Test name: MW521 RH
 Test defined on: 5/30/2003 11:13:26
 Test started on: 5/30/2003 11:13:47
 Test stopped on: 5/30/2003 11:16:48
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 80
 TOTAL DATA SAMPLES 80
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 5.216 Feet H2O

Values oscillate, are negative, and there is not much displacement

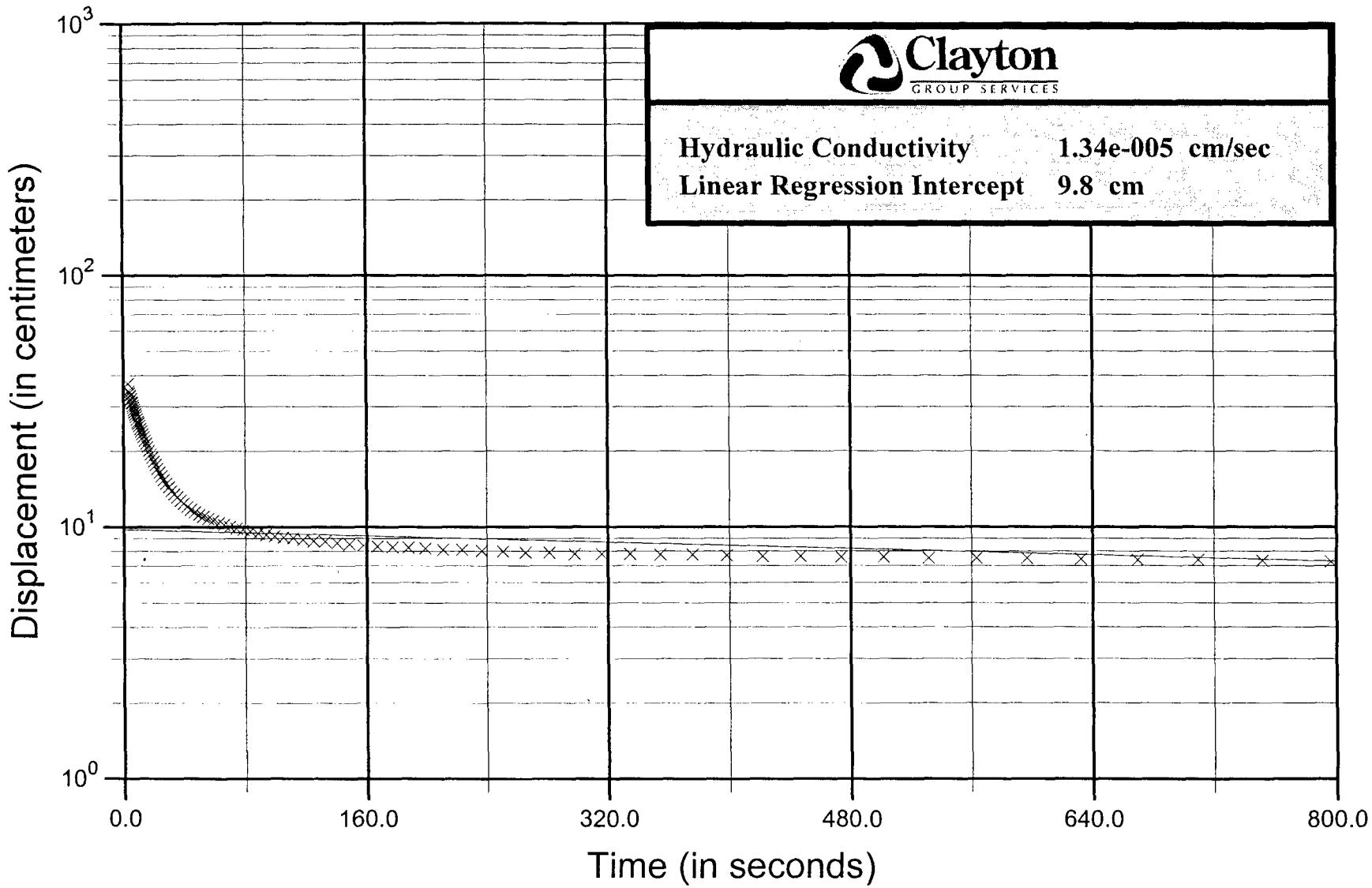
Slug Size: 3 ft x 1.5 in
Depth to water (bgs)=52.42'
Screen length (amount exposed to aquifer)=7.58'
Aquifer thickness=7.58'
Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/30/2003	11:13:47	0	53.73	0	-0.6	0
5/30/2003	11:13:47	0.3	53.78	-0.679	-0.3	-20.6959
5/30/2003	11:13:47	0.6	53.78	-0.055	0	-1.6764
5/30/2003	11:13:48	0.9	53.78	-0.288	0.3	-8.77824
5/30/2003	11:13:48	1.2	53.78	-0.455	0.6	-13.8684
5/30/2003	11:13:48	1.5	53.8	-0.586	0.9	-17.8613

Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/30/2003	11:13:49	1.8	53.8	-0.684	1.2	-20.8483
5/30/2003	11:13:49	2.1	53.8	-0.767	1.5	-23.3782
5/30/2003	11:13:49	2.4	53.8	-0.828	1.8	-25.2374
5/30/2003	11:13:49	2.7	53.8	-0.878	2.1	-26.7614
5/30/2003	11:13:50	3	53.8	-0.917	2.4	-27.9502
5/30/2003	11:13:50	3.3	53.8	-0.946	2.7	-28.8341
5/30/2003	11:13:50	3.6	53.8	-0.969	3	-29.5351
5/30/2003	11:13:51	3.9	53.8	-0.986	3.3	-30.0533
5/30/2003	11:13:51	4.2	53.8	-1	3.6	-30.48
5/30/2003	11:13:51	4.5	53.8	-1.009	3.9	-30.7543
5/30/2003	11:13:52	4.8	53.8	-1.019	4.2	-31.0591
5/30/2003	11:13:52	5.1	53.82	-1.024	4.5	-31.2115
5/30/2003	11:13:52	5.4	53.82	-1.028	4.8	-31.3334
5/30/2003	11:13:52	5.7	53.82	-1.032	5.1	-31.4554
5/30/2003	11:13:53	6	53.82	-1.034	5.4	-31.5163
5/30/2003	11:13:53	6.4	53.82	-1.036	5.8	-31.5773
5/30/2003	11:13:53	6.7	53.82	-1.038	6.1	-31.6382
5/30/2003	11:13:54	7.1	53.82	-1.04	6.5	-31.6992
5/30/2003	11:13:54	7.5	53.82	-1.038	6.9	-31.6382
5/30/2003	11:13:55	8	53.82	-1.04	7.4	-31.6992
5/30/2003	11:13:55	8.4	53.82	-1.04	7.8	-31.6992
5/30/2003	11:13:56	8.9	53.82	-1.04	8.3	-31.6992
5/30/2003	11:13:56	9.5	53.82	-1.04	8.9	-31.6992
5/30/2003	11:13:57	10	53.8	-1.032	9.4	-31.4554
5/30/2003	11:13:57	10.6	53.8	-1.03	10	-31.3944
5/30/2003	11:13:58	11.3	53.8	-1.029	10.7	-31.3639
5/30/2003	11:13:59	11.9	53.8	-1.029	11.3	-31.3639
5/30/2003	11:13:59	12.6	53.8	-1.027	12	-31.303
5/30/2003	11:14:00	13.4	53.8	-1.027	12.8	-31.303
5/30/2003	11:14:01	14.2	53.78	-1.025	13.6	-31.242
5/30/2003	11:14:02	15	53.78	-1.025	14.4	-31.242
5/30/2003	11:14:03	15.9	53.78	-1.023	15.3	-31.181
5/30/2003	11:14:04	16.8	53.78	-1.025	16.2	-31.242
5/30/2003	11:14:05	17.8	53.8	-1.023	17.2	-31.181
5/30/2003	11:14:06	18.9	53.78	-1.021	18.3	-31.1201
5/30/2003	11:14:07	20	53.78	-1.023	19.4	-31.181
5/30/2003	11:14:08	21.2	53.8	-1.021	20.6	-31.1201
5/30/2003	11:14:09	22.4	53.78	-1.021	21.8	-31.1201
5/30/2003	11:14:11	23.8	53.78	-1.021	23.2	-31.1201
5/30/2003	11:14:12	25.2	53.78	-1.021	24.6	-31.1201
5/30/2003	11:14:13	26.7	53.78	-1.021	26.1	-31.1201
5/30/2003	11:14:15	28.2	53.78	-1.021	27.6	-31.1201
5/30/2003	11:14:17	29.8	53.78	-1.021	29.2	-31.1201
5/30/2003	11:14:18	31.5	53.78	-1.019	30.9	-31.0591
5/30/2003	11:14:20	33.3	53.78	-1.021	32.7	-31.1201
5/30/2003	11:14:22	35.2	53.78	-1.019	34.6	-31.0591
5/30/2003	11:14:24	37.3	53.78	-1.019	36.7	-31.0591
5/30/2003	11:14:26	39.5	53.78	-1.019	38.9	-31.0591
5/30/2003	11:14:29	41.8	53.78	-1.019	41.2	-31.0591

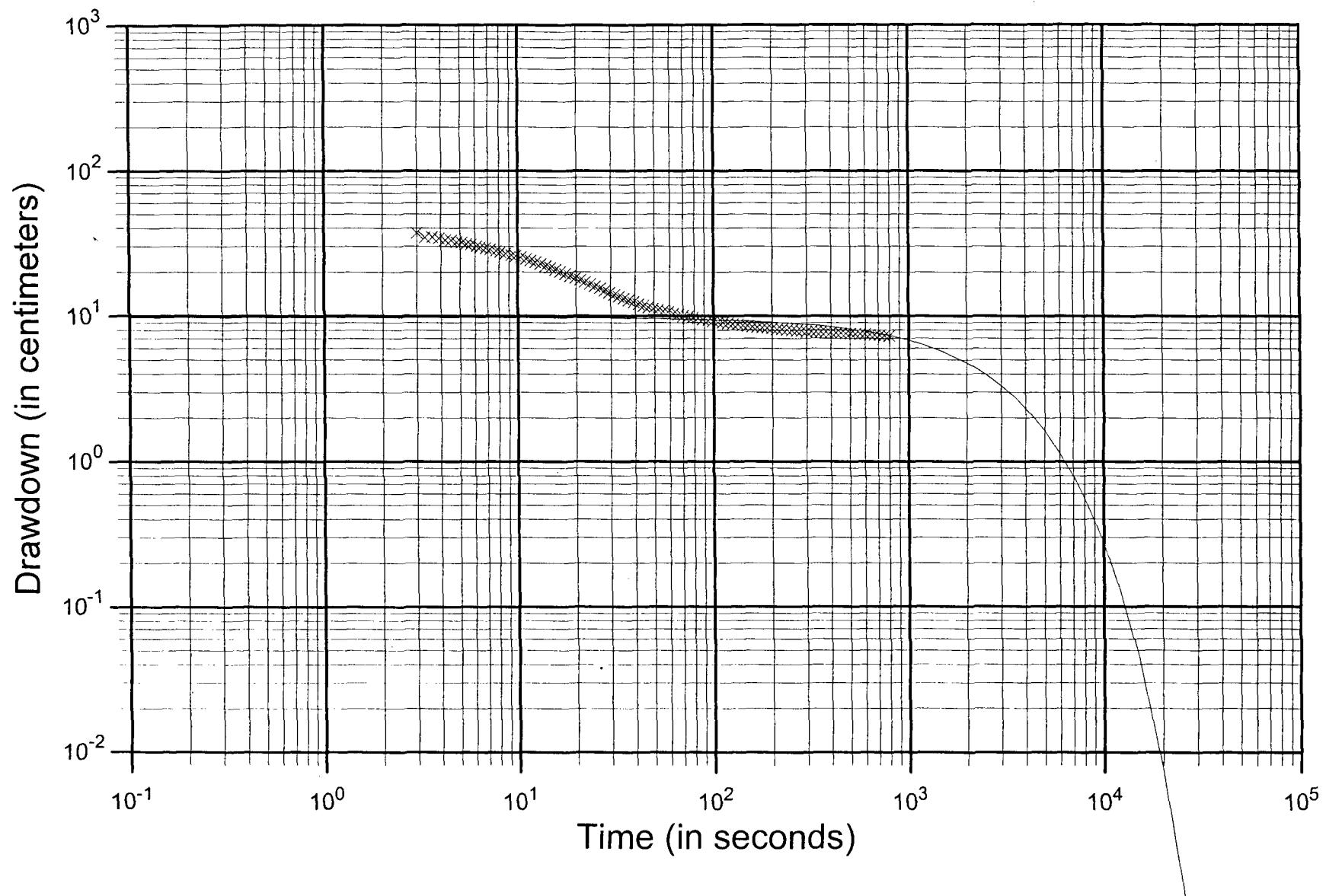
Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/30/2003	11:14:31	44.3	53.78	-1.019	43.7	-31.0591
5/30/2003	11:14:34	46.9	53.78	-1.019	46.3	-31.0591
5/30/2003	11:14:36	49.7	53.78	-1.019	49.1	-31.0591
5/30/2003	11:14:39	52.6	53.78	-1.019	52	-31.0591
5/30/2003	11:14:42	55.7	53.78	-1.019	55.1	-31.0591
5/30/2003	11:14:46	59	53.75	-1.018	58.4	-31.0286
5/30/2003	11:14:49	62.5	53.78	-1.019	61.9	-31.0591
5/30/2003	11:14:53	66.2	53.78	-1.019	65.6	-31.0591
5/30/2003	11:14:57	70.1	53.78	-1.019	69.5	-31.0591
5/30/2003	11:15:01	74.3	53.75	-1.02	73.7	-31.0896
5/30/2003	11:15:05	78.7	53.75	-1.02	78.1	-31.0896
5/30/2003	11:15:10	83.4	53.75	-1.018	82.8	-31.0286
5/30/2003	11:15:15	88.4	53.75	-1.018	87.8	-31.0286
5/30/2003	11:15:20	93.7	53.75	-1.02	93.1	-31.0896
5/30/2003	11:15:26	99.3	53.75	-1.02	98.7	-31.0896
5/30/2003	11:15:32	105.2	53.75	-1.02	104.6	-31.0896
5/30/2003	11:15:38	111.5	53.75	-1.02	110.9	-31.0896
5/30/2003	11:15:45	118.1	53.75	-1.02	117.5	-31.0896
5/30/2003	11:15:52	125.1	53.75	-1.02	124.5	-31.0896
5/30/2003	11:15:59	132.6	53.75	-1.02	132	-31.0896
5/30/2003	11:16:07	140.5	53.73	-1.02	139.9	-31.0896
5/30/2003	11:16:16	148.9	53.73	-1.02	148.3	-31.0896
5/30/2003	11:16:25	157.8	53.73	-1.02	157.2	-31.0896
5/30/2003	11:16:34	167.2	53.73	-1.022	166.6	-31.1506
5/30/2003	11:16:44	177.2	53.73	-1.022	176.6	-31.1506

MW522 Rising Head Slug Test

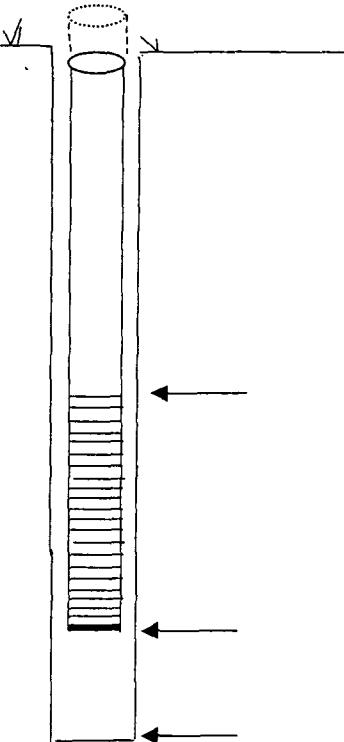


Bouwer and Rice Method (1976)

MW522 RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION							
Project Name				Lockformer			
Project No.				Well ID MW-522			
Field Personnel				Test Date 5/30/2003			
EQUIPMENT INFORMATION							
Data Logger Type / Model No.				Unconfined			
Transducer Type / Model No.							
Slug Length / Volume							
GENERAL INFORMATION							
Static Groundwater Elevation		653.65 ft MSL					
Ground Surface Elevation		703.3 ft MSL					
Top of Casing Elevation		706.29 ft MSL					
Well Stick-up		2.99	ft				
Depth to Water		1604.5	cm				
Diameter of Well Casing		52.64	in				
Diameter of Borehole at Screen		20.3	cm				
Screen Interval		50.0 - 60.0	ft BG				
Screen Length		1524 - 1829	cm BG				
Base of Boring		304.8	cm				
Base of Upper Confining Unit		1828.8	cm BG				
Top of Lower Confining Unit		0.0	cm BG				
Saturated Thickness (b)		10.66	ft				
Static Height of Water in Well		324.9	cm				
Geology of Aquifer		Sand					
SLUG TEST MEASUREMENT INFORMATION							
Parameter		Falling Head			Rising Head		
Initial Water Level Above Transducer			ft	cm	9	ft	274.32 cm
Initial Drawdown/Recovery			ft	cm	1.78	ft	54.102 cm
SLUG TEST RESULTS							
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units		
Notes:							

In-Situ Inc. MiniTroll Pro
 Report generated: 5/30/2003 13:56:13
 Report from file: ...\\SN05914 2003-05-30 103556 MW522 RH.bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL
 Test name: MW522 RH
 Test defined on: 5/30/2003 10:35:35
 Test started on: 5/30/2003 10:35:56
 Test stopped on: 5/30/2003 10:49:44
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 106
 TOTAL DATA SAMPLES 106
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 10.557 Feet H2O

Slug Size: 3 ft x 1.5 in

Depth to water (bgs)=49.65'

Screen length (amount exposed to aquifer)=0.35'

Aquifer thickness=0.35'

Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/30/2003	10:35:56	0	54	0	-1.2	0
5/30/2003	10:35:56	0.3	54.05	1.039	-0.9	31.66872
5/30/2003	10:35:56	0.6	54.05	0.307	-0.6	9.35736
5/30/2003	10:35:57	0.9	54.05	0.628	-0.3	19.14144
5/30/2003	10:35:57	1.2	54.07	1.775	0	54.102
5/30/2003	10:35:57	1.5	54.07	0.251		

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/30/2003	10:35:58	1.8	54.07	-0.707		
5/30/2003	10:35:58	2.1	54.07	1.446	0.9	44.07408
5/30/2003	10:35:58	2.4	54.07	0.93		
5/30/2003	10:35:58	2.7	54.07	1.376	1.5	41.94048
5/30/2003	10:35:59	3	54.07	1.115		
5/30/2003	10:35:59	3.3	54.07	1.219	2.1	37.15512
5/30/2003	10:35:59	3.6	54.07	1.136	2.4	34.62528
5/30/2003	10:36:00	3.9	54.07	1.142	2.7	34.80816
5/30/2003	10:36:00	4.2	54.07	1.121	3	34.16808
5/30/2003	10:36:00	4.5	54.07	1.092	3.3	33.28416
5/30/2003	10:36:01	4.8	54.07	1.09	3.6	33.2232
5/30/2003	10:36:01	5.1	54.07	1.055	3.9	32.1564
5/30/2003	10:36:01	5.4	54.07	1.053	4.2	32.09544
5/30/2003	10:36:01	5.7	54.07	1.024	4.5	31.21152
5/30/2003	10:36:02	6	54.07	1.017	4.8	30.99816
5/30/2003	10:36:02	6.4	54.07	0.994	5.2	30.29712
5/30/2003	10:36:02	6.7	54.1	0.979	5.5	29.83992
5/30/2003	10:36:03	7.1	54.1	0.959	5.9	29.23032
5/30/2003	10:36:03	7.5	54.1	0.94	6.3	28.6512
5/30/2003	10:36:04	8	54.1	0.921	6.8	28.07208
5/30/2003	10:36:04	8.4	54.1	0.902	7.2	27.49296
5/30/2003	10:36:05	8.9	54.1	0.88	7.7	26.8224
5/30/2003	10:36:05	9.5	54.1	0.861	8.3	26.24328
5/30/2003	10:36:06	10	54.07	0.849	8.8	25.87752
5/30/2003	10:36:06	10.6	54.05	0.83	9.4	25.2984
5/30/2003	10:36:07	11.3	54.05	0.809	10.1	24.65832
5/30/2003	10:36:08	11.9	54.05	0.789	10.7	24.04872
5/30/2003	10:36:08	12.6	54.05	0.768	11.4	23.40864
5/30/2003	10:36:09	13.4	54.05	0.749	12.2	22.82952
5/30/2003	10:36:10	14.2	54.05	0.726	13	22.12848
5/30/2003	10:36:11	15	54.05	0.705	13.8	21.4884
5/30/2003	10:36:12	15.9	54.05	0.684	14.7	20.84832
5/30/2003	10:36:13	16.8	54.05	0.662	15.6	20.17776
5/30/2003	10:36:14	17.8	54.05	0.639	16.6	19.47672
5/30/2003	10:36:15	18.9	54.05	0.62	17.7	18.8976
5/30/2003	10:36:16	20	54.05	0.599	18.8	18.25752
5/30/2003	10:36:17	21.2	54.05	0.58	20	17.6784
5/30/2003	10:36:18	22.4	54.05	0.56	21.2	17.0688
5/30/2003	10:36:20	23.8	54.05	0.541	22.6	16.48968
5/30/2003	10:36:21	25.2	54.05	0.524	24	15.97152
5/30/2003	10:36:22	26.7	54.05	0.507	25.5	15.45336
5/30/2003	10:36:24	28.2	54.05	0.489	27	14.90472
5/30/2003	10:36:26	29.8	54.05	0.474	28.6	14.44752
5/30/2003	10:36:27	31.5	54.05	0.458	30.3	13.95984
5/30/2003	10:36:29	33.3	54.05	0.445	32.1	13.5636
5/30/2003	10:36:31	35.2	54.05	0.432	34	13.16736
5/30/2003	10:36:33	37.3	54.05	0.418	36.1	12.74064
5/30/2003	10:36:35	39.5	54.05	0.408	38.3	12.43584
5/30/2003	10:36:38	41.8	54.05	0.395	40.6	12.0396

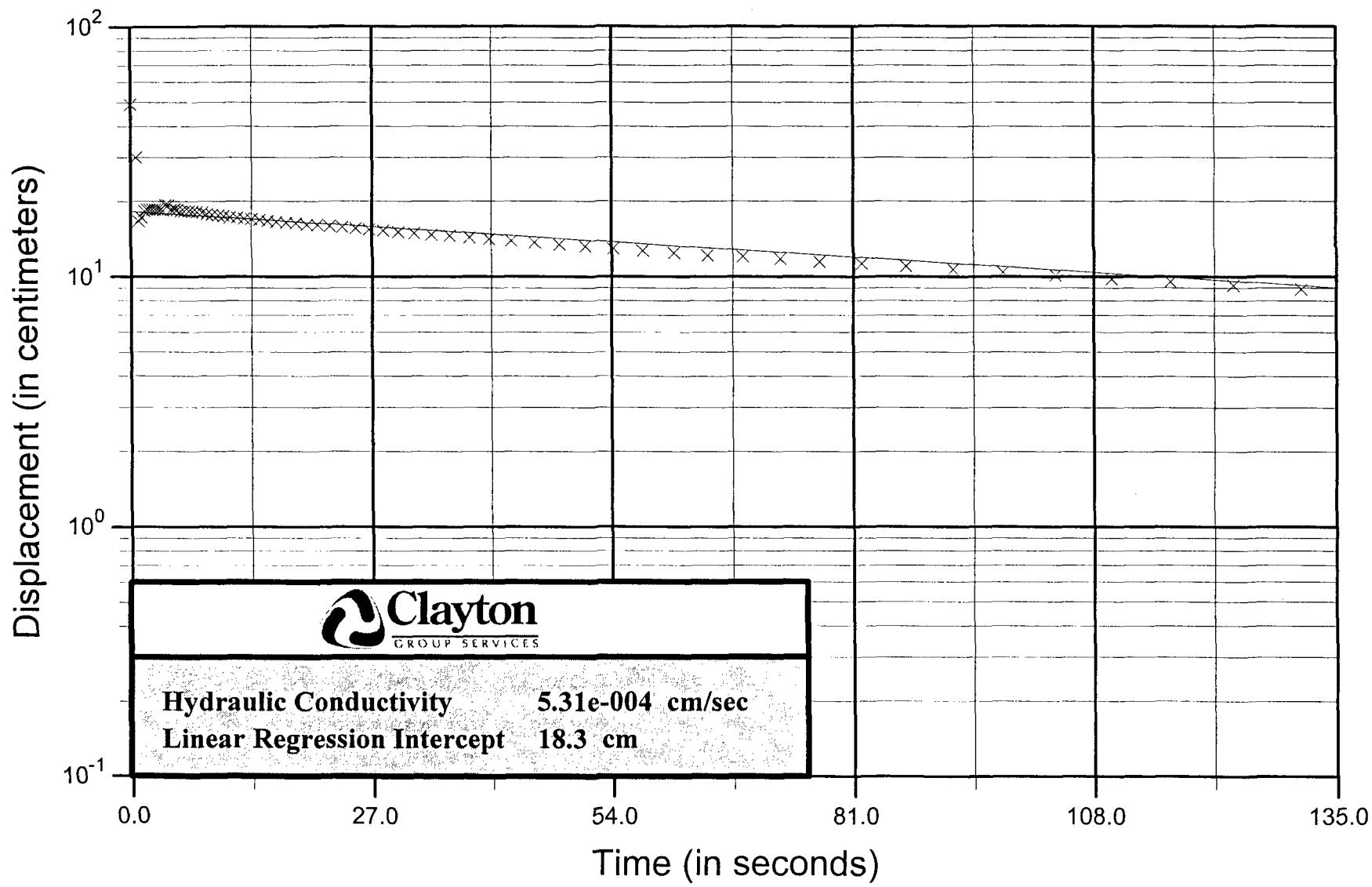
Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/30/2003	10:36:40	44.3	54.05	0.385	43.1	11.7348
5/30/2003	10:36:43	46.9	54.05	0.376	45.7	11.46048
5/30/2003	10:36:45	49.7	54.03	0.368	48.5	11.21664
5/30/2003	10:36:48	52.6	54.03	0.362	51.4	11.03376
5/30/2003	10:36:51	55.7	54.03	0.354	54.5	10.78992
5/30/2003	10:36:55	59	54.03	0.349	57.8	10.63752
5/30/2003	10:36:58	62.5	54.03	0.341	61.3	10.39368
5/30/2003	10:37:02	66.2	54.03	0.335	65	10.2108
5/30/2003	10:37:06	70.1	54.03	0.329	68.9	10.02792
5/30/2003	10:37:10	74.3	54.03	0.324	73.1	9.87552
5/30/2003	10:37:14	78.7	54.03	0.32	77.5	9.7536
5/30/2003	10:37:19	83.4	54.03	0.316	82.2	9.63168
5/30/2003	10:37:24	88.4	54.03	0.31	87.2	9.4488
5/30/2003	10:37:29	93.7	54.03	0.306	92.5	9.32688
5/30/2003	10:37:35	99.3	54.03	0.302	98.1	9.20496
5/30/2003	10:37:41	105.2	54.03	0.298	104	9.08304
5/30/2003	10:37:47	111.5	54.03	0.297	110.3	9.05256
5/30/2003	10:37:54	118.1	54.03	0.293	116.9	8.93064
5/30/2003	10:38:01	125.1	54.03	0.289	123.9	8.80872
5/30/2003	10:38:08	132.6	54	0.287	131.4	8.74776
5/30/2003	10:38:16	140.5	54.03	0.283	139.3	8.62584
5/30/2003	10:38:25	148.9	54.03	0.281	147.7	8.56488
5/30/2003	10:38:34	157.8	54	0.277	156.6	8.44296
5/30/2003	10:38:43	167.2	54	0.275	166	8.382
5/30/2003	10:38:53	177.2	54	0.273	176	8.32104
5/30/2003	10:39:04	187.8	54.03	0.272	186.6	8.29056
5/30/2003	10:39:15	199	54.03	0.27	197.8	8.2296
5/30/2003	10:39:27	210.9	54.03	0.266	209.7	8.10768
5/30/2003	10:39:39	223.5	54.03	0.266	222.3	8.10768
5/30/2003	10:39:53	236.8	54.03	0.264	235.6	8.04672
5/30/2003	10:40:07	250.9	54.03	0.262	249.7	7.98576
5/30/2003	10:40:22	265.8	54.03	0.26	264.6	7.9248
5/30/2003	10:40:37	281.6	54.03	0.26	280.4	7.9248
5/30/2003	10:40:54	298.4	54.03	0.256	297.2	7.80288
5/30/2003	10:41:12	316.2	54.03	0.256	315	7.80288
5/30/2003	10:41:31	335	54.03	0.256	333.8	7.80288
5/30/2003	10:41:51	354.9	54.05	0.255	353.7	7.7724
5/30/2003	10:42:12	376	54.05	0.255	374.8	7.7724
5/30/2003	10:42:34	398.4	54.05	0.253	397.2	7.71144
5/30/2003	10:42:58	422.1	54.05	0.251	420.9	7.65048
5/30/2003	10:43:23	447.2	54.05	0.251	446	7.65048
5/30/2003	10:43:50	473.8	54.05	0.249	472.6	7.58952
5/30/2003	10:44:18	502	54.05	0.249	500.8	7.58952
5/30/2003	10:44:48	531.9	54.05	0.247	530.7	7.52856
5/30/2003	10:45:19	563.5	54.05	0.247	562.3	7.52856
5/30/2003	10:45:53	597	54.05	0.247	595.8	7.52856
5/30/2003	10:46:28	632.5	54.05	0.245	631.3	7.4676
5/30/2003	10:47:06	670.1	54.05	0.243	668.9	7.40664
5/30/2003	10:47:46	709.9	54.05	0.243	708.7	7.40664

Date	Time	ET (sec)	Fahrenheit	Chan[1]	Chan[2]	Feet H2O	Time (sec)	Head (cm)
5/30/2003	10:48:28	752.1	54.05	0.241	750.9	7.34568		
5/30/2003	10:49:13	796.8	54.05	0.239	795.6	7.28472		

3	37.16
3.3	34.63
3.6	34.81
3.9	34.17
4.2	33.28
4.5	33.22
4.8	32.16
5.1	32.10
5.4	31.21
5.7	31.00
6.1	30.30
6.4	29.84
6.8	29.23
7.2	28.65
7.7	28.07
8.1	27.49
8.6	26.82
9.2	26.24
9.7	25.88
10.3	25.30
11	24.66
11.6	24.05
12.3	23.41
13.1	22.83
13.9	22.13
14.7	21.49
15.6	20.85
16.5	20.18
17.5	19.48
18.6	18.90
19.7	18.26
20.9	17.68
22.1	17.07
23.5	16.49
24.9	15.97
26.4	15.45
27.9	14.90
29.5	14.45
31.2	13.96
33	13.56
34.9	13.17
37	12.74
39.2	12.44
41.5	12.04
44	11.73
46.6	11.46
49.4	11.22
52.3	11.03
55.4	10.79
58.7	10.64
62.2	10.39
65.9	10.21

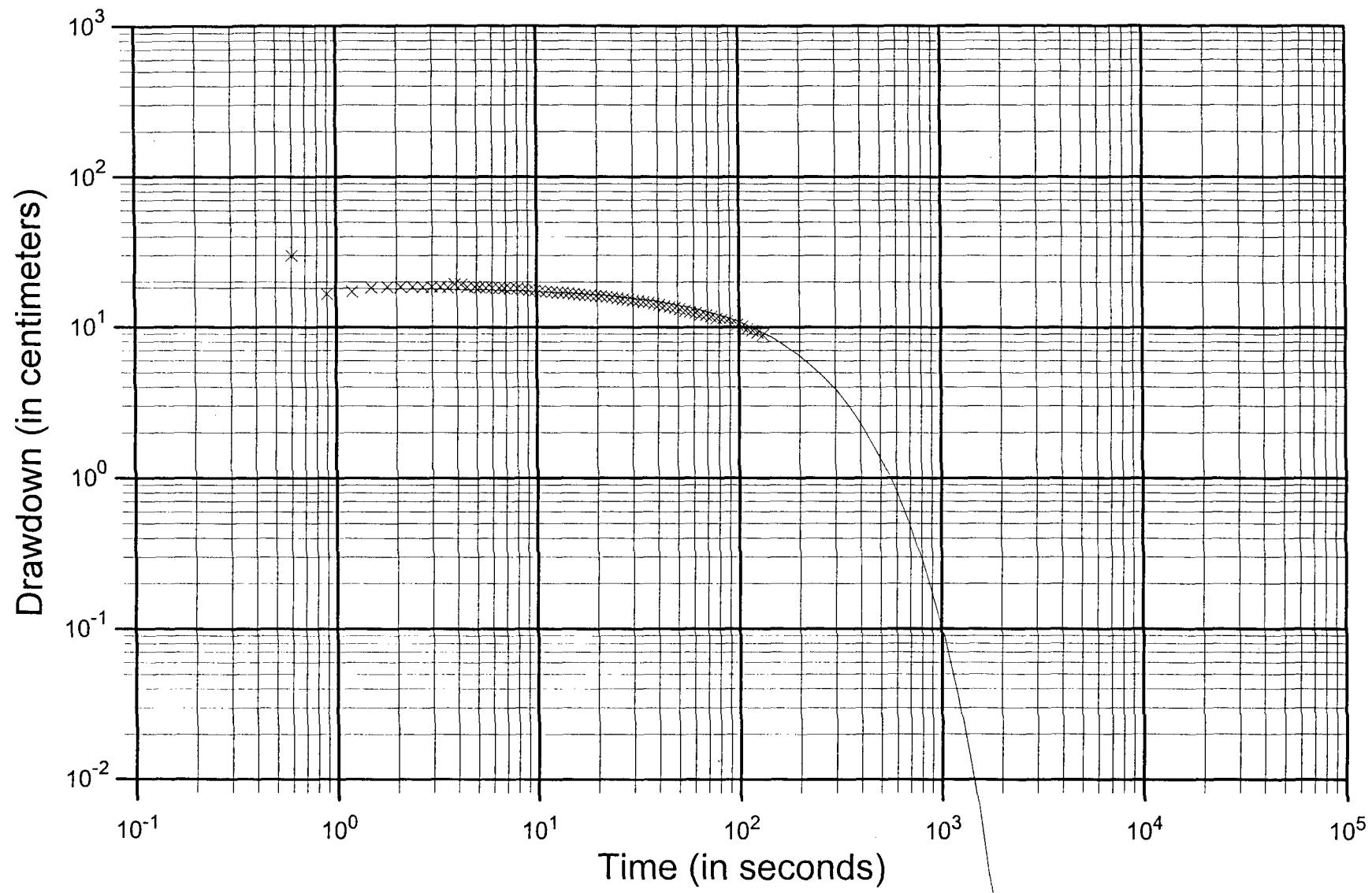
41.5	12.04
44	11.73
46.6	11.46
69.8	10.03
74	9.88
78.4	9.75
83.1	9.63
88.1	9.45
93.4	9.33
99	9.20
104.9	9.08
111.2	9.05
117.8	8.93
124.8	8.81
132.3	8.75
140.2	8.63
148.6	8.56
157.5	8.44
166.9	8.38
176.9	8.32
187.5	8.29
198.7	8.23
210.6	8.11
223.2	8.11
236.5	8.05
250.6	7.99
265.5	7.92
281.3	7.92
298.1	7.80
315.9	7.80
334.7	7.80
354.6	7.77
375.7	7.77
398.1	7.71
421.8	7.65
446.9	7.65
473.5	7.59
501.7	7.59
531.6	7.53
563.2	7.53
596.7	7.53
632.2	7.47
669.8	7.41
709.6	7.41
751.8	7.35
796.5	7.28

MW1100S Falling Head Slug Test

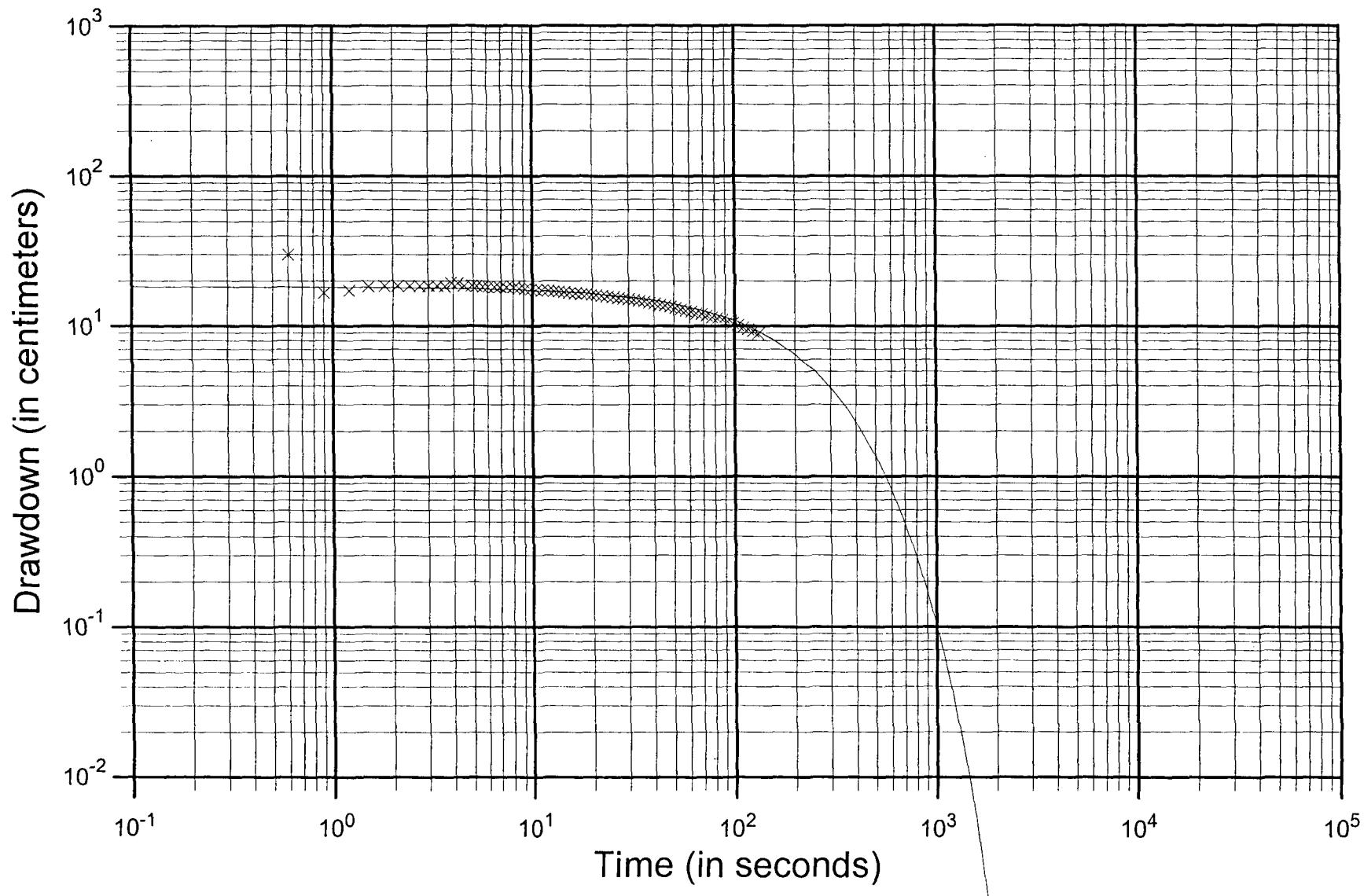


Bouwer and Rice Method (1976)

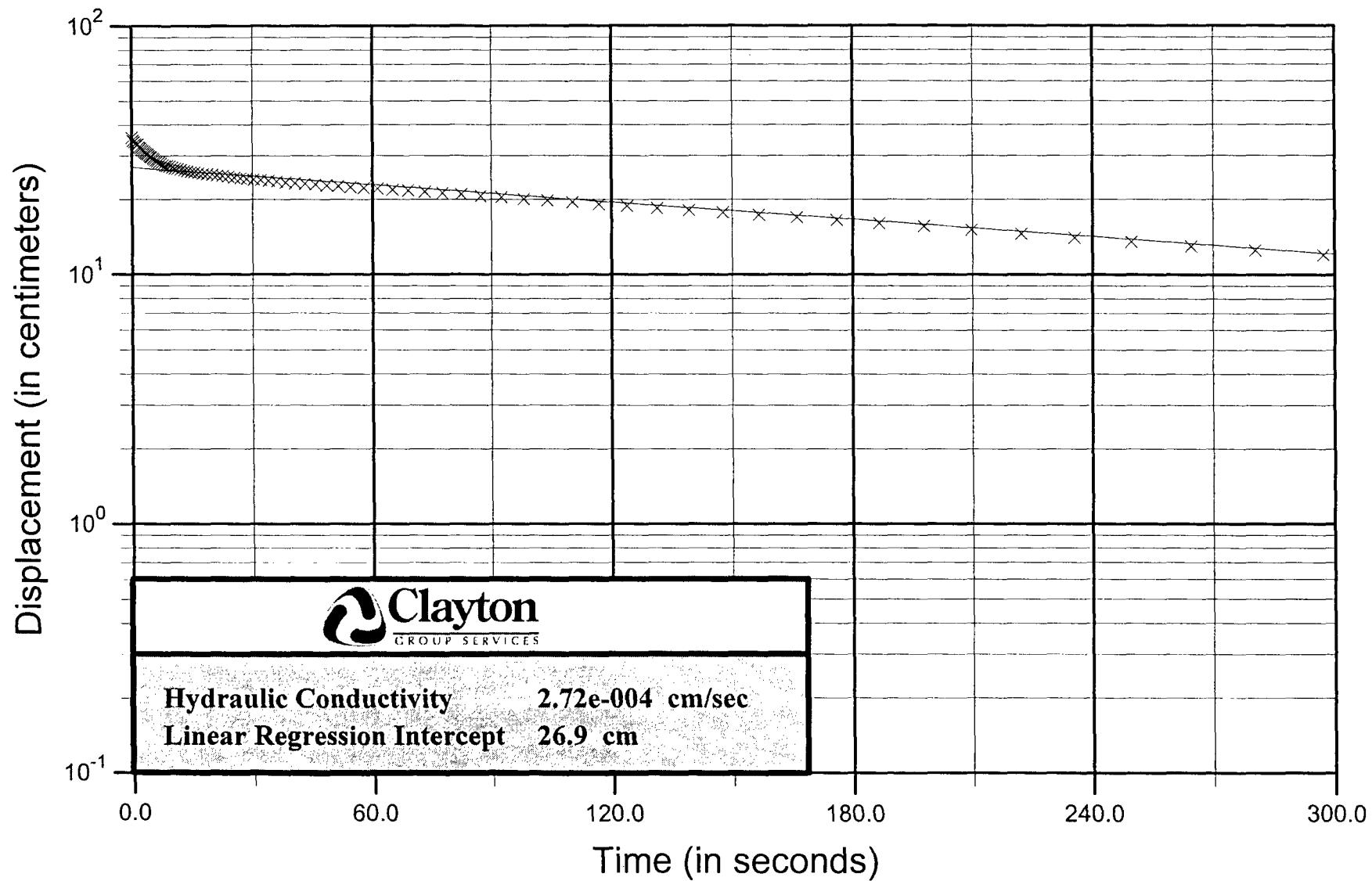
MW1100S FH (Plot vs. Predicted Curve)



MW1100S FH (Plot vs. Predicted Curve)

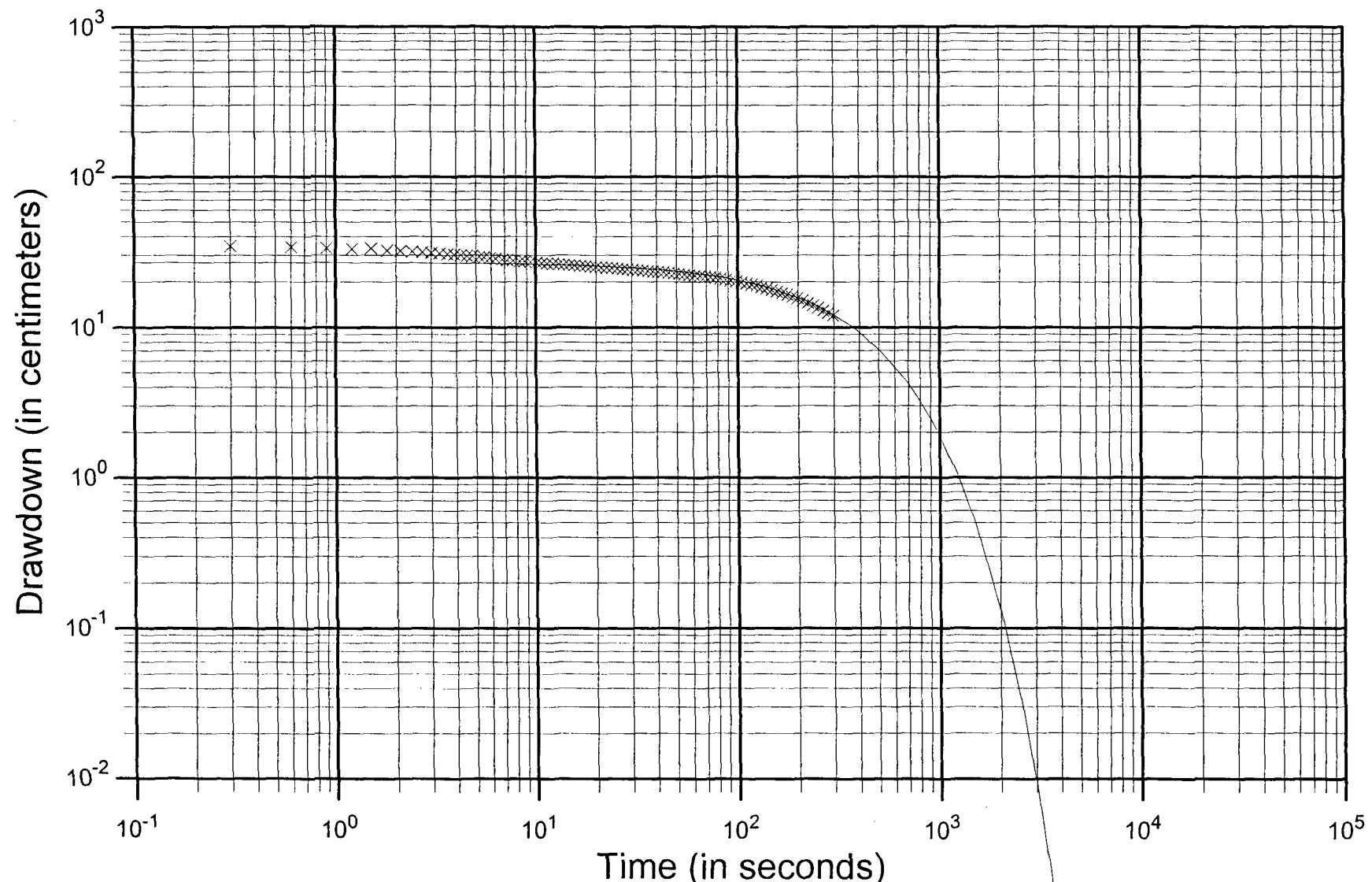


MW1100S Rising Head Slug Test

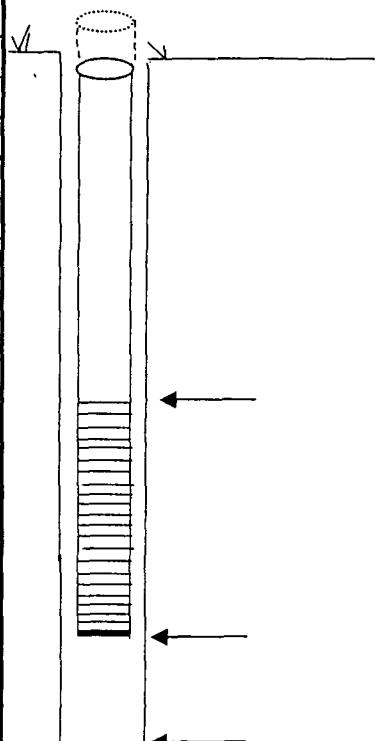


Bouwer and Rice Method (1976)

MW1100S RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION									
Project Name	Lockformer Lisle, IL		Well ID	MW-1100S					
Project No.	15-65263.01-001		Test Date	6/2/2003					
Field Personnel	K. Woloszyn		Unconfined						
EQUIPMENT INFORMATION				ILLUSTRATION OF INFORMATION					
Data Logger Type / Model No.	In-Situ								
Transducer Type / Model No.	Minitroll #5914								
Slug Length / Volume	2 feet / 0.18 gallons								
GENERAL INFORMATION									
Static Groundwater Elevation	654.52 ft MSL								
Ground Surface Elevation	688.1 ft MSL								
Top of Casing Elevation	690.42 ft MSL								
Well Stick-up	2.32	ft	70.7	cm					
Depth to Water	35.9	ft	1094.2	cm					
Diameter of Well Casing	2	in	5.1	cm					
Diameter of Borehole at Screen	8	in	20.3	cm					
Screen Interval	29.0 - 39.0	ft BG	884 - 1189	cm BG					
Screen Length	10	ft	304.8	cm					
Base of Boring	39	ft BG	1188.7	cm BG					
Base of Upper Confining Unit	---	ft BG	0.0	cm BG					
Top of Lower Confining Unit	---	ft BG	0.0	cm BG					
Saturated Thickness (b)	4	ft	121.9	cm					
Static Height of Water in Well	5.22	ft	159.1	cm					
Geology of Aquifer	Sand								
SLUG TEST MEASUREMENT INFORMATION									
Parameter		Falling Head		Rising Head					
Initial Water Level Above Transducer	3.5	ft	106.68	cm	3.5	ft	106.68	cm	
Initial Drawdown/Recovery	1.61	ft	49.07	cm	1.17	ft	35.57	cm	
SLUG TEST RESULTS									
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units				
Notes:									

In-Situ Inc. MiniTroll Pro
Report generated: 6/3/2003 18:53:36
Report from file: ...ISN05914 2003-06-02 143715 MW1100S FH.bin
Win-Situ Version 4.41

Serial number: 5914
Firmware Version 3.07
Unit name: MiniTROLL

Test name: MW1100S FH

Test defined on: 6/2/2003 14:36:27
Test started on: 6/2/2003 14:37:15
Test stopped on: 6/2/2003 14:39:33
Test extracted on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 600.0 Seconds.
Number of data samples: 75

TOTAL DATA SAMPLES 75

Channel number [1]
Measurement type: Temperature
Channel name: Temperature

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 30 PSIG.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 4.856 Feet H2O

Slug Size: 2ft x 1.5 in

Depth to water (bgs)=33.60'

Screen length (amount exposed to aquifer)=3.40'

Aquifer thickness=3.40'

Top of screen (water above screen)=0

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
	6/2/2003	14:37:15	0	54.23	0	-1.5
	6/2/2003	14:37:15	0.3	54.26	0.498	-1.2
	6/2/2003	14:37:15	0.6	54.28	3.122	-0.9
	6/2/2003	14:37:16	0.9	54.28	1.181	-0.6
	6/2/2003	14:37:16	1.2	54.28	-0.47	-0.3
	6/2/2003	14:37:16	1.5	54.28	1.61	-14.33
					0.0	49.07

Date	Time	ET (sec)	Fahrenheit	Feet H2O	Time (sec)	Head (cm)
6/2/2003	14:37:16	1.8	54.28	-0.549		
6/2/2003	14:37:17	2.1	54.28	0.985	0.6	30.02
6/2/2003	14:37:17	2.4	54.28	0.548	0.9	16.70
6/2/2003	14:37:17	2.7	54.28	0.567	1.2	17.28
6/2/2003	14:37:18	3	54.28	0.602	1.5	18.35
6/2/2003	14:37:18	3.3	54.28	0.609	1.8	18.56
6/2/2003	14:37:18	3.6	54.28	0.611	2.1	18.62
6/2/2003	14:37:19	3.9	54.3	0.611	2.4	18.62
6/2/2003	14:37:19	4.2	54.28	0.611	2.7	18.62
6/2/2003	14:37:19	4.5	54.3	0.611	3.0	18.62
6/2/2003	14:37:19	4.8	54.3	0.611	3.3	18.62
6/2/2003	14:37:20	5.1	54.28	0.604	3.6	18.41
6/2/2003	14:37:20	5.4	54.3	0.636	3.9	19.39
6/2/2003	14:37:20	5.7	54.3	0.634	4.2	19.32
6/2/2003	14:37:21	6	54.3	0.609	4.5	18.56
6/2/2003	14:37:21	6.4	54.3	0.613	4.9	18.68
6/2/2003	14:37:21	6.7	54.3	0.607	5.2	18.50
6/2/2003	14:37:22	7.1	54.3	0.601	5.6	18.32
6/2/2003	14:37:22	7.5	54.3	0.601	6.0	18.32
6/2/2003	14:37:23	8	54.3	0.601	6.5	18.32
6/2/2003	14:37:23	8.4	54.3	0.598	6.9	18.23
6/2/2003	14:37:24	8.9	54.3	0.596	7.4	18.17
6/2/2003	14:37:24	9.5	54.3	0.594	8.0	18.11
6/2/2003	14:37:25	10	54.28	0.584	8.5	17.80
6/2/2003	14:37:25	10.6	54.28	0.581	9.1	17.71
6/2/2003	14:37:26	11.3	54.26	0.577	9.8	17.59
6/2/2003	14:37:27	11.9	54.28	0.573	10.4	17.47
6/2/2003	14:37:27	12.6	54.26	0.567	11.1	17.28
6/2/2003	14:37:28	13.4	54.26	0.565	11.9	17.22
6/2/2003	14:37:29	14.2	54.26	0.56	12.7	17.07
6/2/2003	14:37:30	15	54.26	0.558	13.5	17.01
6/2/2003	14:37:31	15.9	54.26	0.554	14.4	16.89
6/2/2003	14:37:31	16.8	54.26	0.548	15.3	16.70
6/2/2003	14:37:32	17.8	54.26	0.544	16.3	16.58
6/2/2003	14:37:34	18.9	54.26	0.54	17.4	16.46
6/2/2003	14:37:35	20	54.26	0.537	18.5	16.37
6/2/2003	14:37:36	21.2	54.23	0.531	19.7	16.18
6/2/2003	14:37:37	22.4	54.23	0.529	20.9	16.12
6/2/2003	14:37:38	23.8	54.23	0.523	22.3	15.94
6/2/2003	14:37:40	25.2	54.23	0.518	23.7	15.79
6/2/2003	14:37:41	26.7	54.23	0.512	25.2	15.61
6/2/2003	14:37:43	28.2	54.23	0.506	26.7	15.42
6/2/2003	14:37:44	29.8	54.23	0.502	28.3	15.30
6/2/2003	14:37:46	31.5	54.23	0.495	30.0	15.09
6/2/2003	14:37:48	33.3	54.23	0.489	31.8	14.90
6/2/2003	14:37:50	35.2	54.21	0.483	33.7	14.72
6/2/2003	14:37:52	37.3	54.21	0.478	35.8	14.57
6/2/2003	14:37:54	39.5	54.21	0.47	38.0	14.33
6/2/2003	14:37:56	41.8	54.21	0.464	40.3	14.14
6/2/2003	14:37:59	44.3	54.21	0.456	42.8	13.90

Date	Time	ET (sec)	Fahrenheit	Feet H2O	Time (sec)	Head (cm)
6/2/2003	14:38:02	46.9	54.21	0.449	45.4	13.69
6/2/2003	14:38:04	49.7	54.21	0.441	48.2	13.44
6/2/2003	14:38:07	52.6	54.19	0.434	51.1	13.23
6/2/2003	14:38:10	55.7	54.19	0.424	54.2	12.92
6/2/2003	14:38:14	59	54.19	0.416	57.5	12.68
6/2/2003	14:38:17	62.5	54.19	0.409	61.0	12.47
6/2/2003	14:38:21	66.2	54.19	0.399	64.7	12.16
6/2/2003	14:38:25	70.1	54.19	0.395	68.6	12.04
6/2/2003	14:38:29	74.3	54.19	0.386	72.8	11.77
6/2/2003	14:38:33	78.7	54.19	0.376	77.2	11.46
6/2/2003	14:38:38	83.4	54.16	0.369	81.9	11.25
6/2/2003	14:38:43	88.4	54.16	0.361	86.9	11.00
6/2/2003	14:38:48	93.7	54.16	0.351	92.2	10.70
6/2/2003	14:38:54	99.3	54.16	0.342	97.8	10.42
6/2/2003	14:39:00	105.2	54.14	0.332	103.7	10.12
6/2/2003	14:39:06	111.5	54.14	0.321	110.0	9.78
6/2/2003	14:39:13	118.1	54.14	0.313	116.6	9.54
6/2/2003	14:39:20	125.1	54.14	0.303	123.6	9.24
6/2/2003	14:39:27	132.6	54.14	0.292	131.1	8.90

In-Situ Inc. MiniTroll Pro

Report generated: 6/3/2003 18:54:16
 Report from file: ...ISN05914 2003-06-02 144039 MW1100S RH.bin
 Win-Situ Version 4.41

Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL

Test name: MW1100S RH

Test defined on: 6/2/2003 14:40:14
 Test started on: 6/2/2003 14:40:39
 Test stopped on: 6/2/2003 14:45:48
 Test extracted on: N/A N/A

Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 89

TOTAL DATA SAMPLES 89

Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature

Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 5.097 Feet H2O

Slug Size: 2ft x 1.5 in

Depth to water (bgs)=33.60'

Screen length (amount exposed to aquifer)=3.40'

Aquifer thickness=3.40'

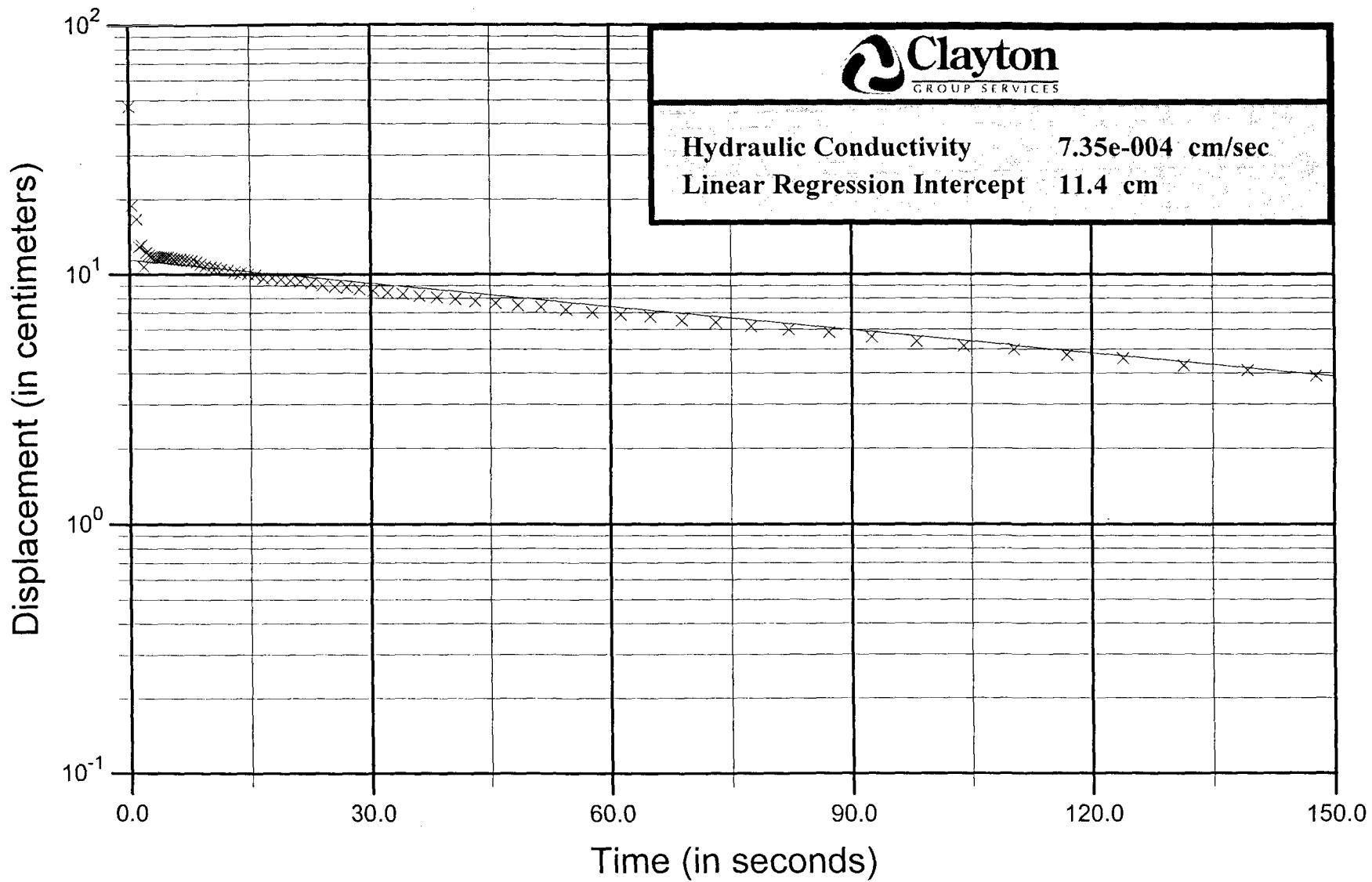
Top of screen (water above screen)=0

Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
	6/2/2003	14:40:39	0	54.21	0	-1.2
	6/2/2003	14:40:39	0.3	54.23	1.917	-0.9
	6/2/2003	14:40:40	0.6	54.23	4.547	-0.6
	6/2/2003	14:40:40	0.9	54.23	1.045	-0.3
	6/2/2003	14:40:40	1.2	54.23	1.167	0.0

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
6/2/2003	14:40:41	1.5	54.26	1.136	0.3	34.63
6/2/2003	14:40:41	1.8	54.26	1.121	0.6	34.17
6/2/2003	14:40:41	2.1	54.26	1.1	0.9	33.53
6/2/2003	14:40:42	2.4	54.26	1.09	1.2	33.22
6/2/2003	14:40:42	2.7	54.26	1.096	1.5	33.41
6/2/2003	14:40:42	3	54.26	1.065	1.8	32.46
6/2/2003	14:40:42	3.3	54.26	1.055	2.1	32.16
6/2/2003	14:40:43	3.6	54.26	1.044	2.4	31.82
6/2/2003	14:40:43	3.9	54.26	1.034	2.7	31.52
6/2/2003	14:40:43	4.2	54.26	1.025	3.0	31.24
6/2/2003	14:40:44	4.5	54.26	1.015	3.3	30.94
6/2/2003	14:40:44	4.8	54.26	1.005	3.6	30.63
6/2/2003	14:40:44	5.1	54.26	0.998	3.9	30.42
6/2/2003	14:40:45	5.4	54.28	0.988	4.2	30.11
6/2/2003	14:40:45	5.7	54.28	0.979	4.5	29.84
6/2/2003	14:40:45	6	54.28	0.973	4.8	29.66
6/2/2003	14:40:46	6.4	54.28	0.963	5.2	29.35
6/2/2003	14:40:46	6.7	54.28	0.954	5.5	29.08
6/2/2003	14:40:46	7.1	54.28	0.944	5.9	28.77
6/2/2003	14:40:47	7.5	54.28	0.936	6.3	28.53
6/2/2003	14:40:47	8	54.28	0.927	6.8	28.25
6/2/2003	14:40:48	8.4	54.28	0.917	7.2	27.95
6/2/2003	14:40:48	8.9	54.28	0.907	7.7	27.65
6/2/2003	14:40:49	9.5	54.28	0.898	8.3	27.37
6/2/2003	14:40:49	10	54.26	0.897	8.8	27.34
6/2/2003	14:40:50	10.6	54.26	0.892	9.4	27.19
6/2/2003	14:40:50	11.3	54.26	0.884	10.1	26.94
6/2/2003	14:40:51	11.9	54.26	0.876	10.7	26.70
6/2/2003	14:40:52	12.6	54.26	0.871	11.4	26.55
6/2/2003	14:40:53	13.4	54.26	0.865	12.2	26.37
6/2/2003	14:40:53	14.2	54.26	0.859	13.0	26.18
6/2/2003	14:40:54	15	54.26	0.853	13.8	26.00
6/2/2003	14:40:55	15.9	54.26	0.847	14.7	25.82
6/2/2003	14:40:56	16.8	54.26	0.844	15.6	25.73
6/2/2003	14:40:57	17.8	54.26	0.838	16.6	25.54
6/2/2003	14:40:58	18.9	54.26	0.834	17.7	25.42
6/2/2003	14:40:59	20	54.26	0.83	18.8	25.30
6/2/2003	14:41:00	21.2	54.26	0.826	20.0	25.18
6/2/2003	14:41:02	22.4	54.26	0.82	21.2	24.99
6/2/2003	14:41:03	23.8	54.26	0.815	22.6	24.84
6/2/2003	14:41:04	25.2	54.26	0.811	24.0	24.72
6/2/2003	14:41:06	26.7	54.26	0.805	25.5	24.54
6/2/2003	14:41:07	28.2	54.26	0.799	27.0	24.35
6/2/2003	14:41:09	29.8	54.26	0.795	28.6	24.23
6/2/2003	14:41:11	31.5	54.28	0.79	30.3	24.08
6/2/2003	14:41:12	33.3	54.28	0.786	32.1	23.96
6/2/2003	14:41:14	35.2	54.28	0.78	34.0	23.77
6/2/2003	14:41:16	37.3	54.28	0.775	36.1	23.62
6/2/2003	14:41:19	39.5	54.28	0.769	38.3	23.44

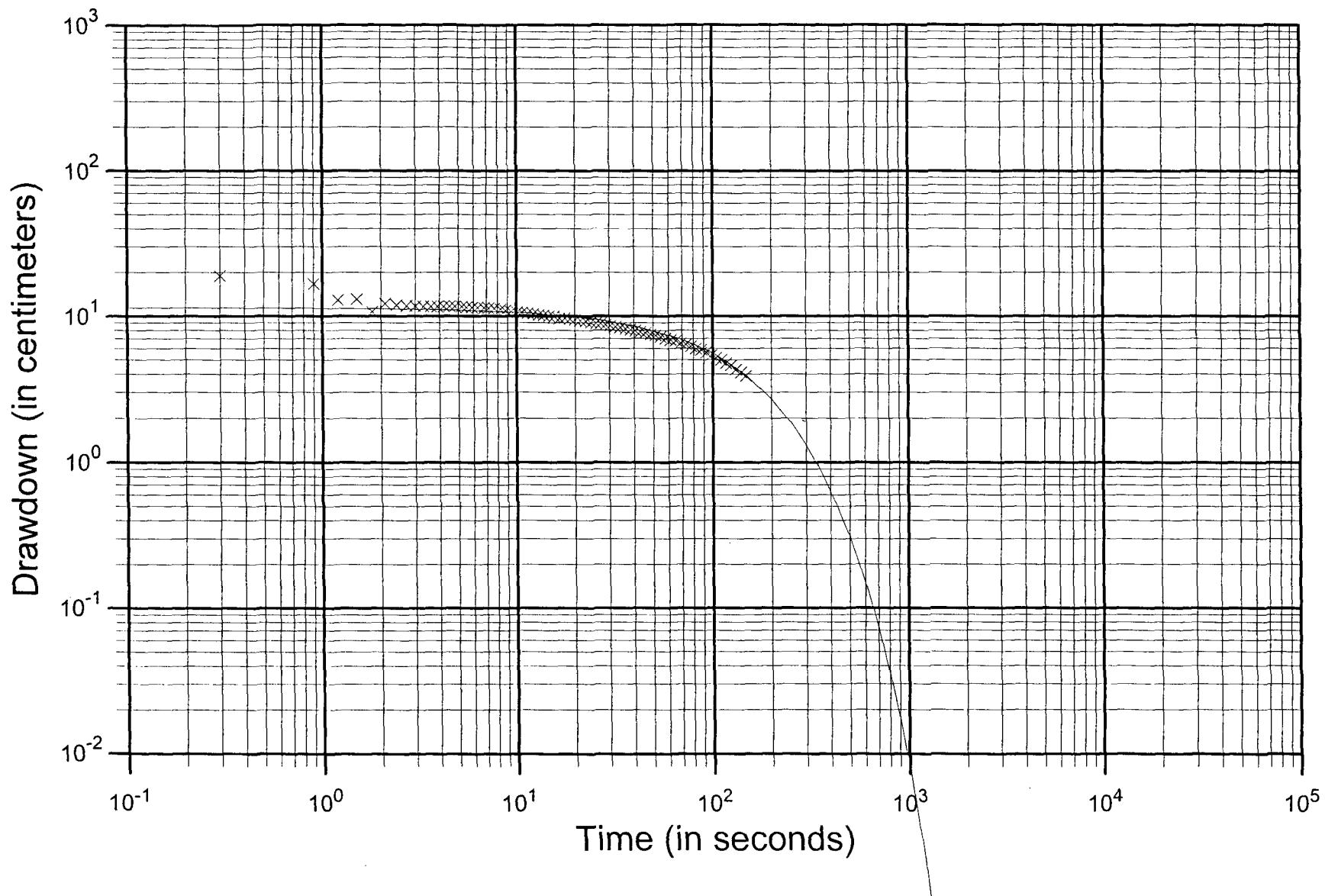
Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
6/2/2003	14:41:21	41.8	54.3	0.763	40.6	23.26
6/2/2003	14:41:23	44.3	54.3	0.76	43.1	23.16
6/2/2003	14:41:26	46.9	54.3	0.754	45.7	22.98
6/2/2003	14:41:29	49.7	54.3	0.748	48.5	22.80
6/2/2003	14:41:32	52.6	54.3	0.742	51.4	22.62
6/2/2003	14:41:35	55.7	54.3	0.736	54.5	22.43
6/2/2003	14:41:38	59	54.32	0.731	57.8	22.28
6/2/2003	14:41:42	62.5	54.3	0.725	61.3	22.10
6/2/2003	14:41:45	66.2	54.3	0.719	65.0	21.92
6/2/2003	14:41:49	70.1	54.32	0.714	68.9	21.76
6/2/2003	14:41:53	74.3	54.32	0.706	73.1	21.52
6/2/2003	14:41:58	78.7	54.32	0.698	77.5	21.28
6/2/2003	14:42:03	83.4	54.32	0.689	82.2	21.00
6/2/2003	14:42:08	88.4	54.32	0.679	87.2	20.70
6/2/2003	14:42:13	93.7	54.32	0.671	92.5	20.45
6/2/2003	14:42:18	99.3	54.35	0.66	98.1	20.12
6/2/2003	14:42:24	105.2	54.35	0.651	104.0	19.84
6/2/2003	14:42:31	111.5	54.35	0.641	110.3	19.54
6/2/2003	14:42:37	118.1	54.35	0.629	116.9	19.17
6/2/2003	14:42:44	125.1	54.35	0.618	123.9	18.84
6/2/2003	14:42:52	132.6	54.35	0.606	131.4	18.47
6/2/2003	14:43:00	140.5	54.35	0.595	139.3	18.14
6/2/2003	14:43:08	148.9	54.35	0.583	147.7	17.77
6/2/2003	14:43:17	157.8	54.35	0.57	156.6	17.37
6/2/2003	14:43:26	167.2	54.35	0.556	166.0	16.95
6/2/2003	14:43:36	177.2	54.35	0.543	176.0	16.55
6/2/2003	14:43:47	187.8	54.35	0.527	186.6	16.06
6/2/2003	14:43:58	199	54.35	0.512	197.8	15.61
6/2/2003	14:44:10	210.9	54.35	0.495	209.7	15.09
6/2/2003	14:44:23	223.5	54.35	0.477	222.3	14.54
6/2/2003	14:44:36	236.8	54.32	0.46	235.6	14.02
6/2/2003	14:44:50	250.9	54.35	0.443	249.7	13.50
6/2/2003	14:45:05	265.8	54.35	0.425	264.6	12.95
6/2/2003	14:45:21	281.6	54.35	0.41	280.4	12.50
6/2/2003	14:45:38	298.4	54.35	0.393	297.2	11.98

MW1101S Falling Head Slug Test

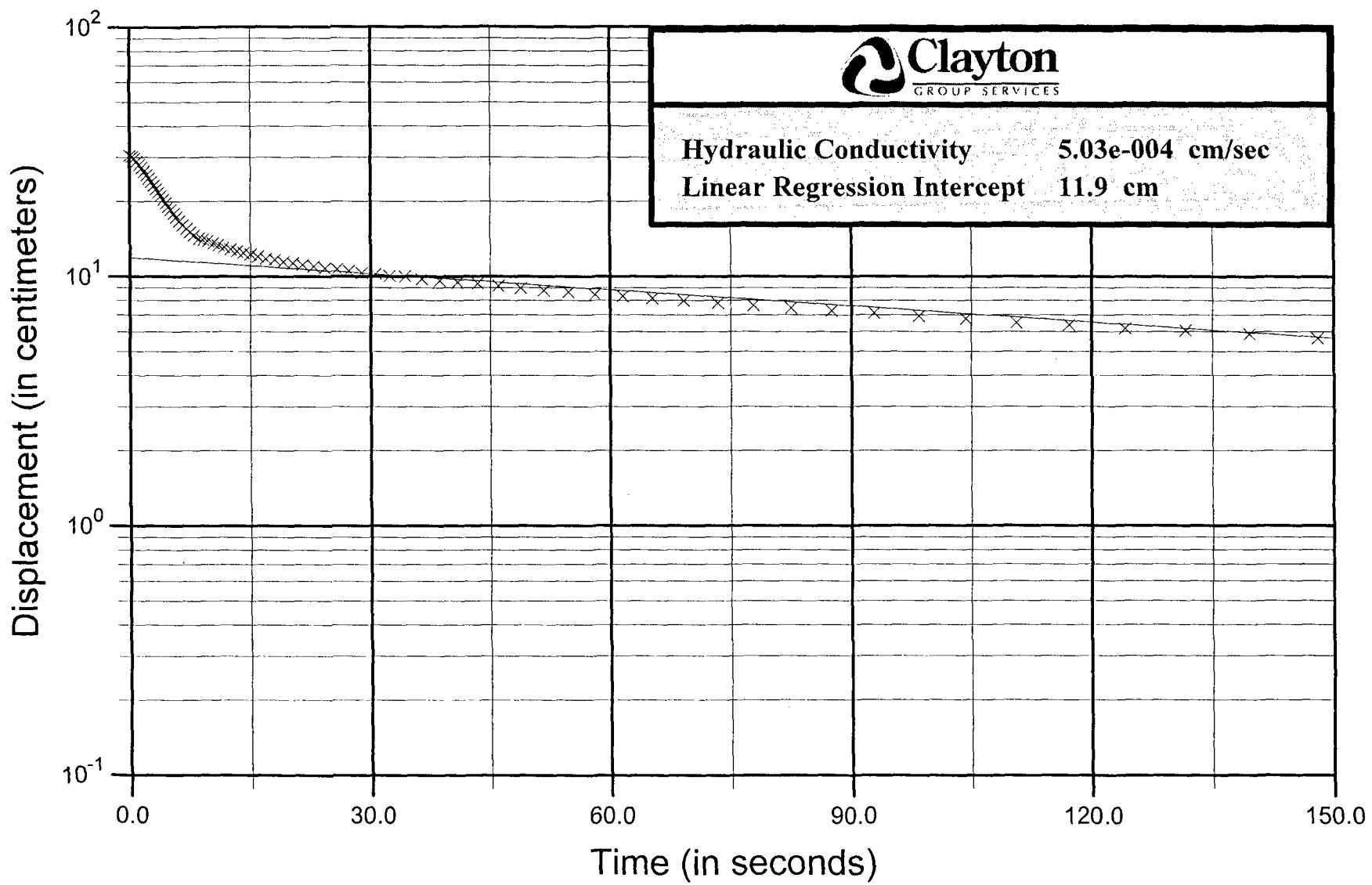


Bouwer and Rice Method (1976)

MW1101S FH (Plot vs. Predicted Curve)

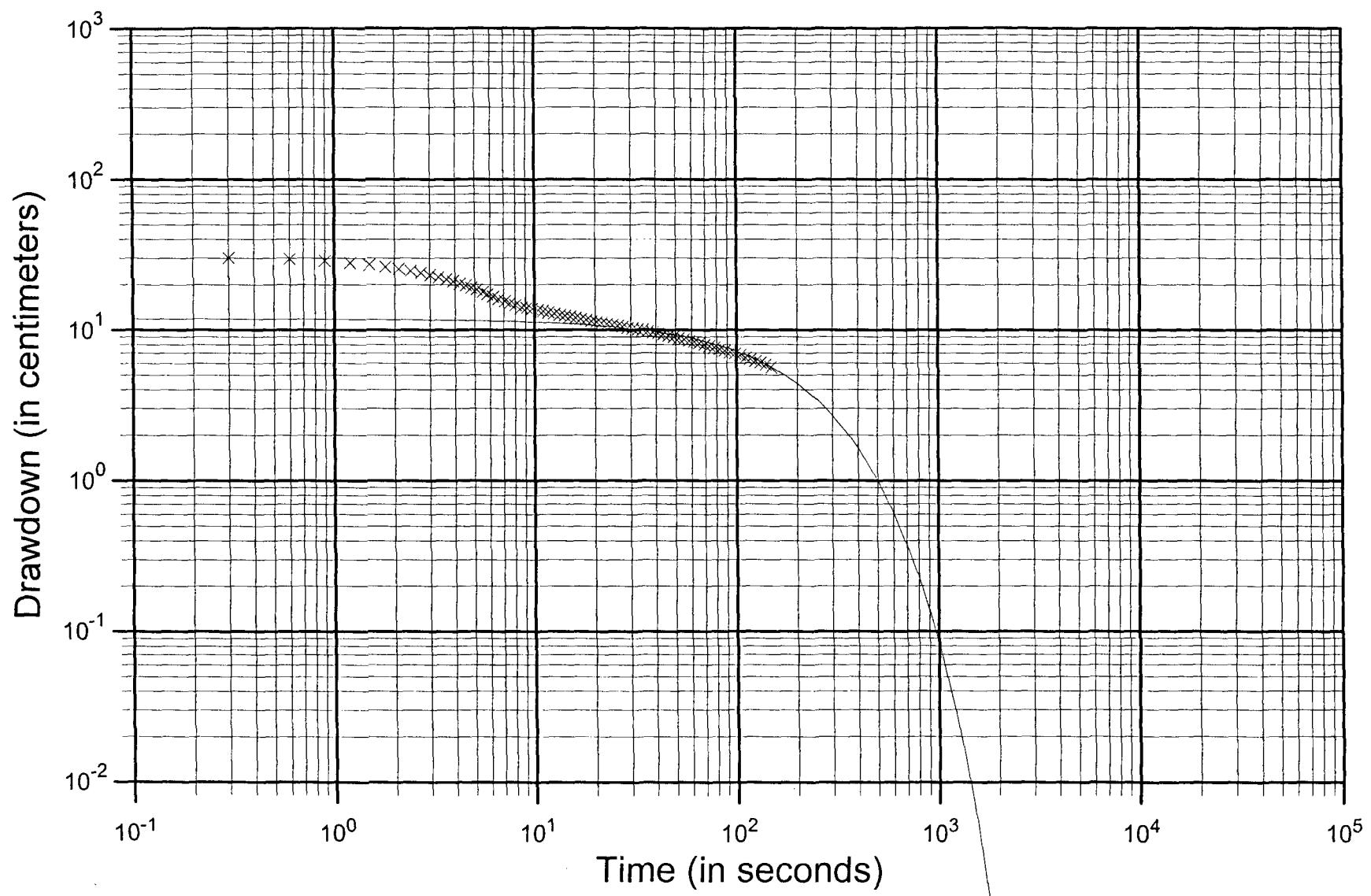


MW1101S Rising Head Slug Test

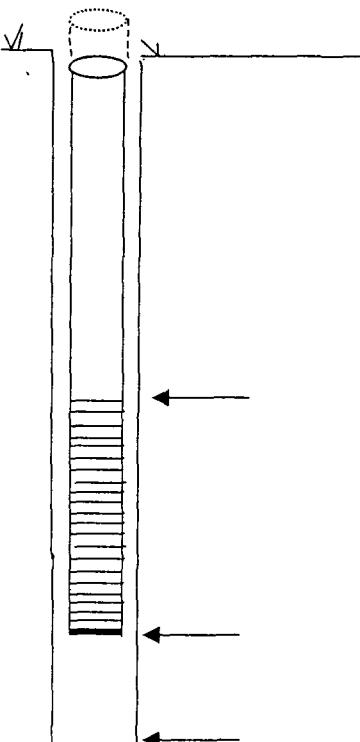


Bouwer and Rice Method (1976)

MW1101S RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION								
Project Name	Lockformer	Lisle, IL	Well ID	MW-1101S				
Project No.	15-65263.01-001		Test Date	6/2/2003				
Field Personnel	K. Woloszyn		Unconfined					
EQUIPMENT INFORMATION				ILLUSTRATION OF INFORMATION				
Data Logger Type / Model No.	In-Situ							
Transducer Type / Model No.	Minitroll #5914							
Slug Length / Volume	2 feet / 0.18 gallons							
GENERAL INFORMATION								
Static Groundwater Elevation	654.9	ft MSL						
Ground Surface Elevation	688.3	ft MSL						
Top of Casing Elevation	690.82	ft MSL						
Well Stick-up	2.52	ft	76.8 cm					
Depth to Water	35.92	ft	1094.8 cm					
Diameter of Well Casing	2	in	5.1 cm					
Diameter of Borehole at Screen	8	in	20.3 cm					
Screen Interval	29.0 - 39.0	ft BG	884 - 1189 cm BG					
Screen Length	10	ft	304.8 cm					
Base of Boring	40	ft BG	1219.2 cm BG					
Base of Upper Confining Unit	---	ft BG	0.0 cm BG					
Top of Lower Confining Unit	---	ft BG	0.0 cm BG					
Saturated Thickness (b)	6	ft	182.9 cm					
Static Height of Water in Well	5.2	ft	158.5 cm					
Geology of Aquifer	Sand							
SLUG TEST MEASUREMENT INFORMATION								
Parameter	Falling Head			Rising Head				
Initial Water Level Above Transducer	4	ft	121.92	cm	4	ft	121.92	cm
Initial Drawdown/Recovery	1.55	ft	47.15	cm	1.00	ft	30.51	cm
SLUG TEST RESULTS								
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units			
<p>Notes:</p> <hr/> <hr/> <hr/>								

In-Situ Inc. MiniTroll Pro
Report generated: 6/3/2003 18:54:52
Report from file: ...\\SN05914 2003-06-02 150048 MW1101S FH.bin
Win-Situ Version 4.41

Serial number: 5914
Firmware Version 3.07
Unit name: MiniTROLL

Test name: MW1101S FH

Test defined on: 6/2/2003 14:59:59
Test started on: 6/2/2003 15:00:48
Test stopped on: 6/2/2003 15:03:21
Test extracted on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 600.0 Seconds.
Number of data samples: 77

TOTAL DATA SAMPLES 77

Channel number [1]
Measurement type: Temperature
Channel name: Temperature

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 30 PSIG.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 4.539 Feet H2O

Slug Size: 2ft x 1.5 in

Depth to water (bgs)=33.77'

Screen length (amount exposed to aquifer)=3.23'

Aquifer thickness=3.23'

Top of screen (water above screen)=0

Date	Time	ET (sec)	Chan[1] Fahrenheit	Chan[2] Feet H2O	Time (sec)	Head (cm)
6/2/2003	15:00:48	0	53.94	0	-1.2	0.00
6/2/2003	15:00:49	0.3	53.96	0.013	-0.9	0.40
6/2/2003	15:00:49	0.6	53.98	0.019	-0.6	0.58
6/2/2003	15:00:49	0.9	53.98	1.212	-0.3	36.94
6/2/2003	15:00:50	1.2	53.98	1.547	0.0	47.15
6/2/2003	15:00:50	1.5	53.98	0.621	0.3	18.93

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
6/2/2003	15:00:50	1.8	53.98	0.194		
6/2/2003	15:00:51	2.1	53.98	0.548	0.9	16.70
6/2/2003	15:00:51	2.4	53.98	0.423	1.2	12.89
6/2/2003	15:00:51	2.7	53.98	0.43	1.5	13.11
6/2/2003	15:00:51	3	53.98	0.352	1.8	10.73
6/2/2003	15:00:52	3.3	53.98	0.402	2.1	12.25
6/2/2003	15:00:52	3.6	53.98	0.392	2.4	11.95
6/2/2003	15:00:52	3.9	53.98	0.388	2.7	11.83
6/2/2003	15:00:53	4.2	53.98	0.386	3.0	11.77
6/2/2003	15:00:53	4.5	53.98	0.384	3.3	11.70
6/2/2003	15:00:53	4.8	53.98	0.384	3.6	11.70
6/2/2003	15:00:54	5.1	53.98	0.384	3.9	11.70
6/2/2003	15:00:54	5.4	53.98	0.384	4.2	11.70
6/2/2003	15:00:54	5.7	53.98	0.384	4.5	11.70
6/2/2003	15:00:54	6	53.98	0.384	4.8	11.70
6/2/2003	15:00:55	6.4	53.98	0.382	5.2	11.64
6/2/2003	15:00:55	6.7	53.98	0.378	5.5	11.52
6/2/2003	15:00:56	7.1	53.98	0.378	5.9	11.52
6/2/2003	15:00:56	7.5	53.98	0.377	6.3	11.49
6/2/2003	15:00:56	8	53.98	0.375	6.8	11.43
6/2/2003	15:00:57	8.4	53.98	0.373	7.2	11.37
6/2/2003	15:00:57	8.9	53.98	0.371	7.7	11.31
6/2/2003	15:00:58	9.5	53.98	0.367	8.3	11.19
6/2/2003	15:00:58	10	53.96	0.36	8.8	10.97
6/2/2003	15:00:59	10.6	53.96	0.354	9.4	10.79
6/2/2003	15:01:00	11.3	53.94	0.35	10.1	10.67
6/2/2003	15:01:00	11.9	53.94	0.348	10.7	10.61
6/2/2003	15:01:01	12.6	53.94	0.343	11.4	10.45
6/2/2003	15:01:02	13.4	53.94	0.341	12.2	10.39
6/2/2003	15:01:03	14.2	53.94	0.335	13.0	10.21
6/2/2003	15:01:03	15	53.94	0.333	13.8	10.15
6/2/2003	15:01:04	15.9	53.91	0.329	14.7	10.03
6/2/2003	15:01:05	16.8	53.91	0.326	15.6	9.94
6/2/2003	15:01:06	17.8	53.91	0.316	16.6	9.63
6/2/2003	15:01:07	18.9	53.91	0.318	17.7	9.69
6/2/2003	15:01:08	20	53.91	0.314	18.8	9.57
6/2/2003	15:01:10	21.2	53.91	0.31	20.0	9.45
6/2/2003	15:01:11	22.4	53.89	0.307	21.2	9.36
6/2/2003	15:01:12	23.8	53.89	0.303	22.6	9.24
6/2/2003	15:01:14	25.2	53.89	0.297	24.0	9.05
6/2/2003	15:01:15	26.7	53.89	0.293	25.5	8.93
6/2/2003	15:01:17	28.2	53.87	0.292	27.0	8.90
6/2/2003	15:01:18	29.8	53.87	0.286	28.6	8.72
6/2/2003	15:01:20	31.5	53.87	0.282	30.3	8.60
6/2/2003	15:01:22	33.3	53.87	0.278	32.1	8.47
6/2/2003	15:01:24	35.2	53.87	0.274	34.0	8.35
6/2/2003	15:01:26	37.3	53.84	0.269	36.1	8.20
6/2/2003	15:01:28	39.5	53.84	0.265	38.3	8.08
6/2/2003	15:01:30	41.8	53.84	0.261	40.6	7.96

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
6/2/2003	15:01:33	44.3	53.82	0.256	43.1	7.80
6/2/2003	15:01:35	46.9	53.82	0.252	45.7	7.68
6/2/2003	15:01:38	49.7	53.82	0.246	48.5	7.50
6/2/2003	15:01:41	52.6	53.8	0.243	51.4	7.41
6/2/2003	15:01:44	55.7	53.8	0.237	54.5	7.22
6/2/2003	15:01:47	59	53.78	0.231	57.8	7.04
6/2/2003	15:01:51	62.5	53.78	0.226	61.3	6.89
6/2/2003	15:01:55	66.2	53.75	0.222	65.0	6.77
6/2/2003	15:01:58	70.1	53.75	0.214	68.9	6.52
6/2/2003	15:02:03	74.3	53.75	0.21	73.1	6.40
6/2/2003	15:02:07	78.7	53.73	0.203	77.5	6.19
6/2/2003	15:02:12	83.4	53.73	0.197	82.2	6.00
6/2/2003	15:02:17	88.4	53.71	0.192	87.2	5.85
6/2/2003	15:02:22	93.7	53.69	0.184	92.5	5.61
6/2/2003	15:02:28	99.3	53.69	0.177	98.1	5.39
6/2/2003	15:02:34	105.2	53.66	0.169	104.0	5.15
6/2/2003	15:02:40	111.5	53.66	0.164	110.3	5.00
6/2/2003	15:02:46	118.1	53.64	0.156	116.9	4.75
6/2/2003	15:02:53	125.1	53.64	0.151	123.9	4.60
6/2/2003	15:03:01	132.6	53.62	0.141	131.4	4.30
6/2/2003	15:03:09	140.5	53.62	0.135	139.3	4.11
6/2/2003	15:03:17	148.9	53.59	0.128	147.7	3.90

In-Situ Inc. MiniTroll Pro

Report generated: 6/3/2003 18:55:30
 Report from file: ...\\SN05914 2003-06-02 150428 MW1101S RH.bin
 Win-Situ Version 4.41

Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL

Test name: MW1101S RH

Test defined on: 6/2/2003 15:04:07
 Test started on: 6/2/2003 15:04:28
 Test stopped on: 6/2/2003 15:06:57
 Test extracted on: N/A N/A

Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 77

TOTAL DATA SAMPLES 77

Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature

Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 4.628 Feet H2O

Slug Size: 2ft x 1.5 in

Depth to water (bgs)=33.77'

Screen length (amount exposed to aquifer)=3.23'

Aquifer thickness=3.23'

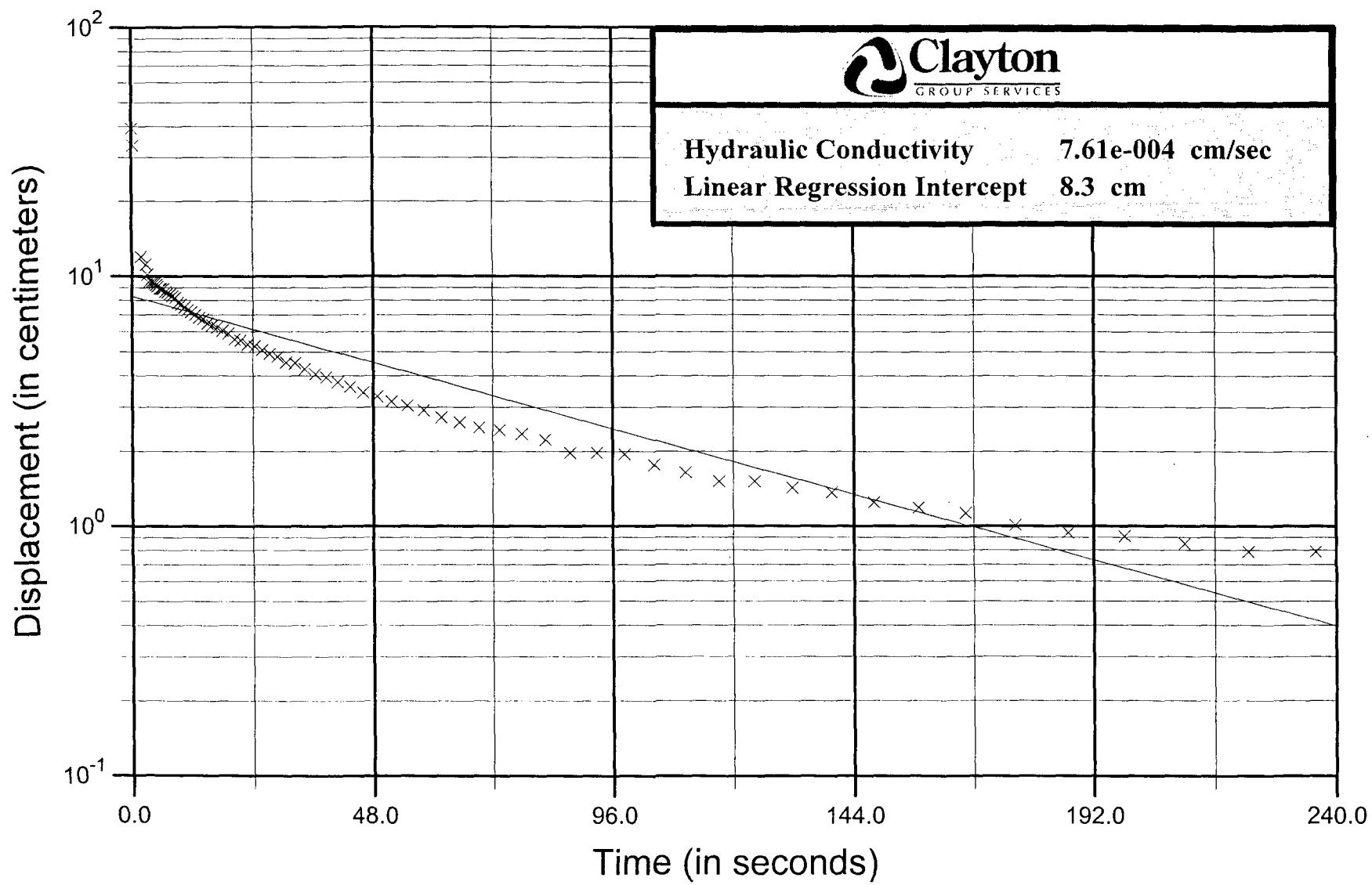
Top of screen (water above screen)=0

Date	Time	ET (sec)	Chan[1]	Chan[2]	Fahrenheit	Feet H2O	Time (sec)	Head (cm)
6/2/2003	15:04:28	0	53.53	0	-0.9	0.00		
6/2/2003	15:04:28	0.3	53.57	2.813	-0.6	85.74		
6/2/2003	15:04:29	0.6	53.57	0.901	-0.3	27.46		
6/2/2003	15:04:29	0.9	53.57	1.001	0.0	30.51		
6/2/2003	15:04:29	1.2	53.57	0.992	0.3	30.24		
6/2/2003	15:04:29	1.5	53.57	0.978	0.6	29.81		

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
6/2/2003	15:04:30	1.8	53.59	0.95	0.9	28.96
6/2/2003	15:04:30	2.1	53.59	0.921	1.2	28.07
6/2/2003	15:04:30	2.4	53.59	0.896	1.5	27.31
6/2/2003	15:04:31	2.7	53.59	0.865	1.8	26.37
6/2/2003	15:04:31	3	53.59	0.838	2.1	25.54
6/2/2003	15:04:31	3.3	53.59	0.813	2.4	24.78
6/2/2003	15:04:32	3.6	53.59	0.788	2.7	24.02
6/2/2003	15:04:32	3.9	53.59	0.761	3.0	23.20
6/2/2003	15:04:32	4.2	53.59	0.738	3.3	22.49
6/2/2003	15:04:32	4.5	53.59	0.715	3.6	21.79
6/2/2003	15:04:33	4.8	53.59	0.692	3.9	21.09
6/2/2003	15:04:33	5.1	53.59	0.669	4.2	20.39
6/2/2003	15:04:33	5.4	53.59	0.648	4.5	19.75
6/2/2003	15:04:34	5.7	53.59	0.626	4.8	19.08
6/2/2003	15:04:34	6	53.59	0.609	5.1	18.56
6/2/2003	15:04:34	6.4	53.59	0.588	5.5	17.92
6/2/2003	15:04:35	6.7	53.59	0.567	5.8	17.28
6/2/2003	15:04:35	7.1	53.59	0.548	6.2	16.70
6/2/2003	15:04:35	7.5	53.59	0.528	6.6	16.09
6/2/2003	15:04:36	8	53.59	0.511	7.1	15.58
6/2/2003	15:04:36	8.4	53.59	0.494	7.5	15.06
6/2/2003	15:04:37	8.9	53.59	0.48	8.0	14.63
6/2/2003	15:04:37	9.5	53.62	0.465	8.6	14.17
6/2/2003	15:04:38	10	53.59	0.461	9.1	14.05
6/2/2003	15:04:39	10.6	53.59	0.455	9.7	13.87
6/2/2003	15:04:39	11.3	53.59	0.446	10.4	13.59
6/2/2003	15:04:40	11.9	53.59	0.438	11.0	13.35
6/2/2003	15:04:41	12.6	53.57	0.43	11.7	13.11
6/2/2003	15:04:41	13.4	53.57	0.422	12.5	12.86
6/2/2003	15:04:42	14.2	53.57	0.414	13.3	12.62
6/2/2003	15:04:43	15	53.57	0.409	14.1	12.47
6/2/2003	15:04:44	15.9	53.57	0.403	15.0	12.28
6/2/2003	15:04:45	16.8	53.57	0.395	15.9	12.04
6/2/2003	15:04:46	17.8	53.57	0.387	16.9	11.80
6/2/2003	15:04:47	18.9	53.57	0.384	18.0	11.70
6/2/2003	15:04:48	20	53.57	0.376	19.1	11.46
6/2/2003	15:04:49	21.2	53.57	0.372	20.3	11.34
6/2/2003	15:04:50	22.4	53.57	0.366	21.5	11.16
6/2/2003	15:04:52	23.8	53.57	0.361	22.9	11.00
6/2/2003	15:04:53	25.2	53.57	0.355	24.3	10.82
6/2/2003	15:04:55	26.7	53.57	0.351	25.8	10.70
6/2/2003	15:04:56	28.2	53.57	0.345	27.3	10.52
6/2/2003	15:04:58	29.8	53.57	0.339	28.9	10.33
6/2/2003	15:04:59	31.5	53.57	0.336	30.6	10.24
6/2/2003	15:05:01	33.3	53.57	0.33	32.4	10.06
6/2/2003	15:05:03	35.2	53.57	0.328	34.3	10.00
6/2/2003	15:05:05	37.3	53.57	0.32	36.4	9.75
6/2/2003	15:05:07	39.5	53.57	0.316	38.6	9.63
6/2/2003	15:05:10	41.8	53.57	0.311	40.9	9.48

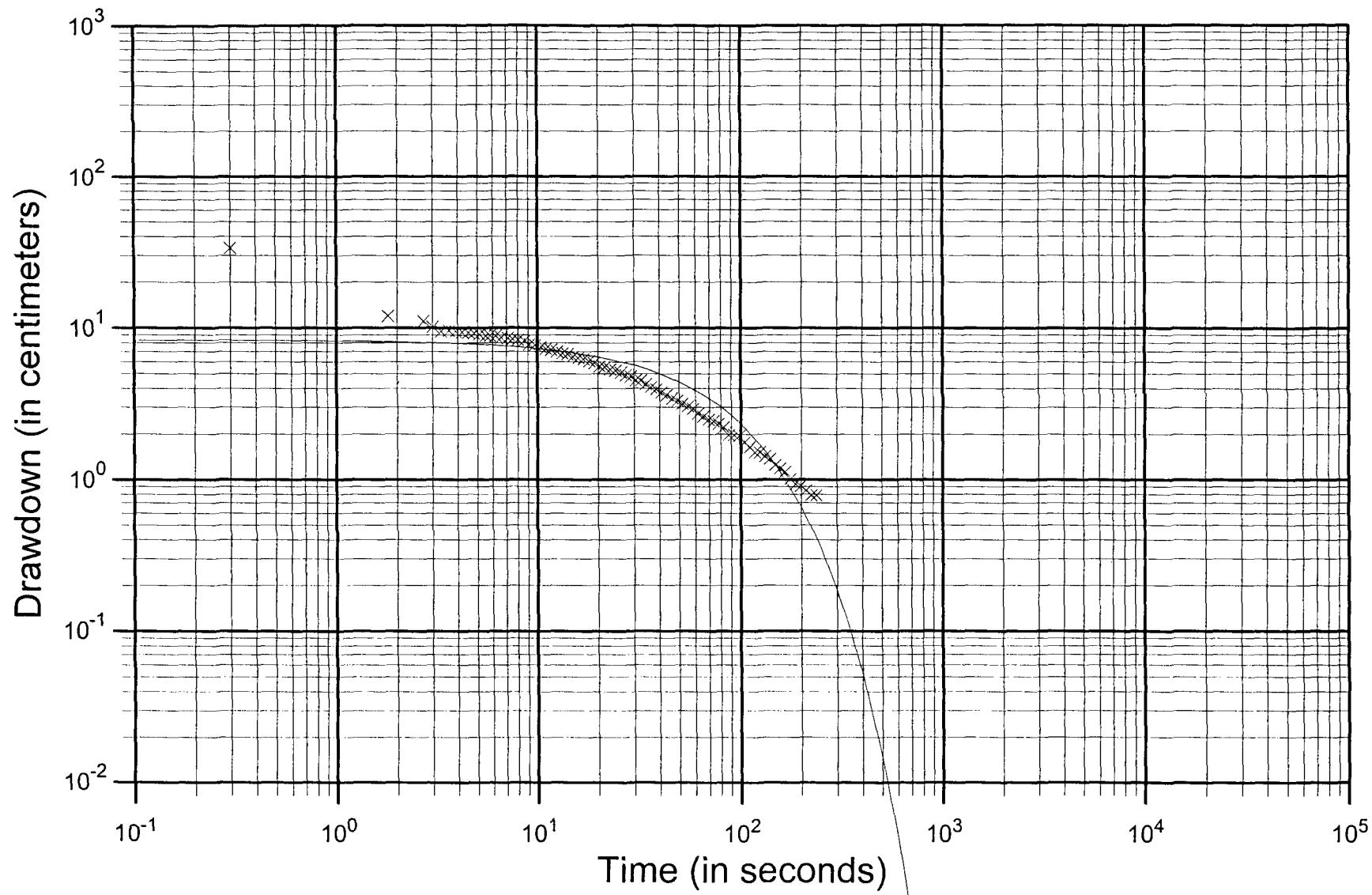
Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
6/2/2003	15:05:12	44.3	53.57	0.307	43.4	9.36
6/2/2003	15:05:15	46.9	53.57	0.301	46.0	9.17
6/2/2003	15:05:18	49.7	53.57	0.295	48.8	8.99
6/2/2003	15:05:21	52.6	53.57	0.289	51.7	8.81
6/2/2003	15:05:24	55.7	53.57	0.284	54.8	8.66
6/2/2003	15:05:27	59	53.57	0.278	58.1	8.47
6/2/2003	15:05:30	62.5	53.57	0.274	61.6	8.35
6/2/2003	15:05:34	66.2	53.57	0.268	65.3	8.17
6/2/2003	15:05:38	70.1	53.57	0.262	69.2	7.99
6/2/2003	15:05:42	74.3	53.57	0.257	73.4	7.83
6/2/2003	15:05:47	78.7	53.57	0.251	77.8	7.65
6/2/2003	15:05:51	83.4	53.57	0.245	82.5	7.47
6/2/2003	15:05:56	88.4	53.57	0.239	87.5	7.28
6/2/2003	15:06:02	93.7	53.57	0.234	92.8	7.13
6/2/2003	15:06:07	99.3	53.57	0.228	98.4	6.95
6/2/2003	15:06:13	105.2	53.57	0.222	104.3	6.77
6/2/2003	15:06:19	111.5	53.57	0.214	110.6	6.52
6/2/2003	15:06:26	118.1	53.57	0.21	117.2	6.40
6/2/2003	15:06:33	125.1	53.57	0.203	124.2	6.19
6/2/2003	15:06:41	132.6	53.57	0.199	131.7	6.07
6/2/2003	15:06:48	140.5	53.57	0.193	139.6	5.88
6/2/2003	15:06:57	148.9	53.57	0.185	148.0	5.64

MW1102S Falling Head Slug Test



Bouwer and Rice Method (1976)

MW1102S FH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

In-Situ Inc. MiniTroll Pro

Report generated: 5/29/2003 16:39:26
 Report from file: ...\\SN05914 2003-05-29 100648 MW1102S FH.bin
 Win-Situ Version 4.41

Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL

Test name: MW1102S FH

Test defined on: 5/29/2003 10:06:16
 Test started on: 5/29/2003 10:06:48
 Test stopped on: 5/29/2003 10:10:53
 Test extracted on: N/A N/A

Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 85

TOTAL DATA SAMPLES 85

Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature

Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: Surface
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 6.148 Feet H2O

Slug Size: 2 ft x 1.5 in

Depth to water (bgs)=44.26'

Screen length (amount exposed to aquifer)=5.74'

Aquifer thickness=5.74'

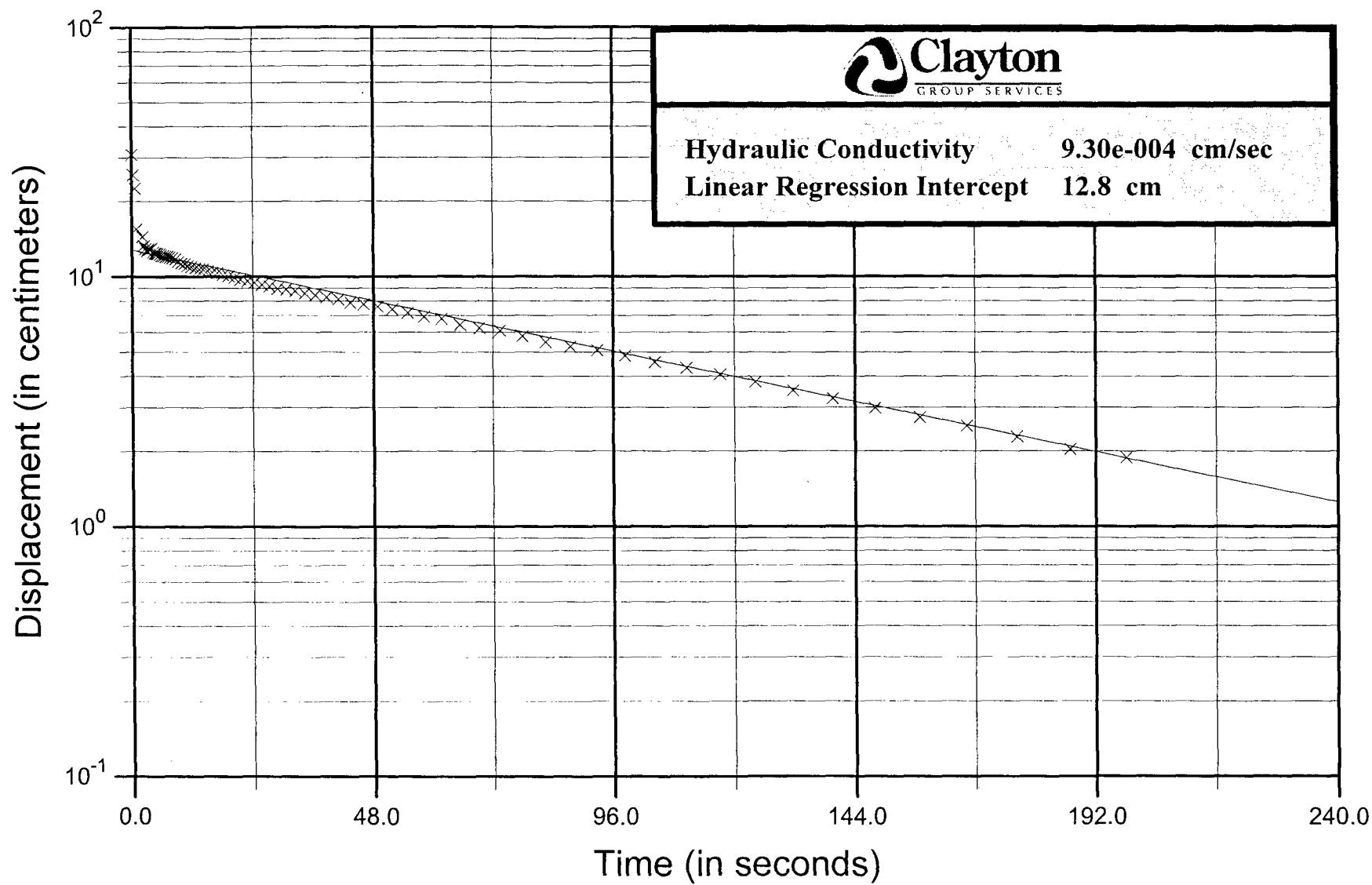
Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
	5/29/2003	10:06:48	0	53.66	0	-0.9
	5/29/2003	10:06:49	0.3	53.69	0.664	-0.6
	5/29/2003	10:06:49	0.6	53.71	2.56	-0.3
	5/29/2003	10:06:49	0.9	53.71	1.294	0.0
	5/29/2003	10:06:50	1.2	53.73	1.104	0.3
	5/29/2003	10:06:50	1.5	53.73	0.52	33.65

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	10:06:50	1.8	53.73	-0.08		
5/29/2003	10:06:51	2.1	53.73	-0.059		
5/29/2003	10:06:51	2.4	53.73	1.461		
5/29/2003	10:06:51	2.7	53.73	0.393	1.8	11.98
5/29/2003	10:06:51	3	53.73	0.091		
5/29/2003	10:06:52	3.3	53.73	0.307		
5/29/2003	10:06:52	3.6	53.73	0.365	2.7	11.13
5/29/2003	10:06:52	3.9	53.73	0.334	3.0	10.18
5/29/2003	10:06:53	4.2	53.73	0.311	3.3	9.48
5/29/2003	10:06:53	4.5	53.73	0.315	3.6	9.60
5/29/2003	10:06:53	4.8	53.73	0.311	3.9	9.48
5/29/2003	10:06:54	5.1	53.73	0.309	4.2	9.42
5/29/2003	10:06:54	5.4	53.73	0.307	4.5	9.36
5/29/2003	10:06:54	5.7	53.73	0.303	4.8	9.24
5/29/2003	10:06:54	6	53.73	0.299	5.1	9.11
5/29/2003	10:06:55	6.4	53.73	0.293	5.5	8.93
5/29/2003	10:06:55	6.7	53.73	0.293	5.8	8.93
5/29/2003	10:06:56	7.1	53.73	0.292	6.2	8.90
5/29/2003	10:06:56	7.5	53.73	0.284	6.6	8.66
5/29/2003	10:06:56	8	53.73	0.282	7.1	8.60
5/29/2003	10:06:57	8.4	53.73	0.278	7.5	8.47
5/29/2003	10:06:57	8.9	53.73	0.274	8.0	8.35
5/29/2003	10:06:58	9.5	53.73	0.27	8.6	8.23
5/29/2003	10:06:59	10	53.73	0.257	9.1	7.83
5/29/2003	10:06:59	10.6	53.73	0.253	9.7	7.71
5/29/2003	10:07:00	11.3	53.73	0.247	10.4	7.53
5/29/2003	10:07:00	11.9	53.71	0.24	11.0	7.32
5/29/2003	10:07:01	12.6	53.71	0.236	11.7	7.19
5/29/2003	10:07:02	13.4	53.71	0.23	12.5	7.01
5/29/2003	10:07:03	14.2	53.71	0.224	13.3	6.83
5/29/2003	10:07:03	15	53.71	0.221	14.1	6.74
5/29/2003	10:07:04	15.9	53.71	0.213	15.0	6.49
5/29/2003	10:07:05	16.8	53.71	0.209	15.9	6.37
5/29/2003	10:07:06	17.8	53.71	0.205	16.9	6.25
5/29/2003	10:07:07	18.9	53.71	0.199	18.0	6.07
5/29/2003	10:07:08	20	53.71	0.194	19.1	5.91
5/29/2003	10:07:10	21.2	53.71	0.184	20.3	5.61
5/29/2003	10:07:11	22.4	53.71	0.182	21.5	5.55
5/29/2003	10:07:12	23.8	53.71	0.176	22.9	5.36
5/29/2003	10:07:14	25.2	53.71	0.173	24.3	5.27
5/29/2003	10:07:15	26.7	53.71	0.167	25.8	5.09
5/29/2003	10:07:17	28.2	53.71	0.161	27.3	4.91
5/29/2003	10:07:18	29.8	53.71	0.157	28.9	4.79
5/29/2003	10:07:20	31.5	53.71	0.149	30.6	4.54
5/29/2003	10:07:22	33.3	53.71	0.148	32.4	4.51
5/29/2003	10:07:24	35.2	53.71	0.14	34.3	4.27
5/29/2003	10:07:26	37.3	53.71	0.134	36.4	4.08
5/29/2003	10:07:28	39.5	53.71	0.13	38.6	3.96
5/29/2003	10:07:30	41.8	53.71	0.124	40.9	3.78

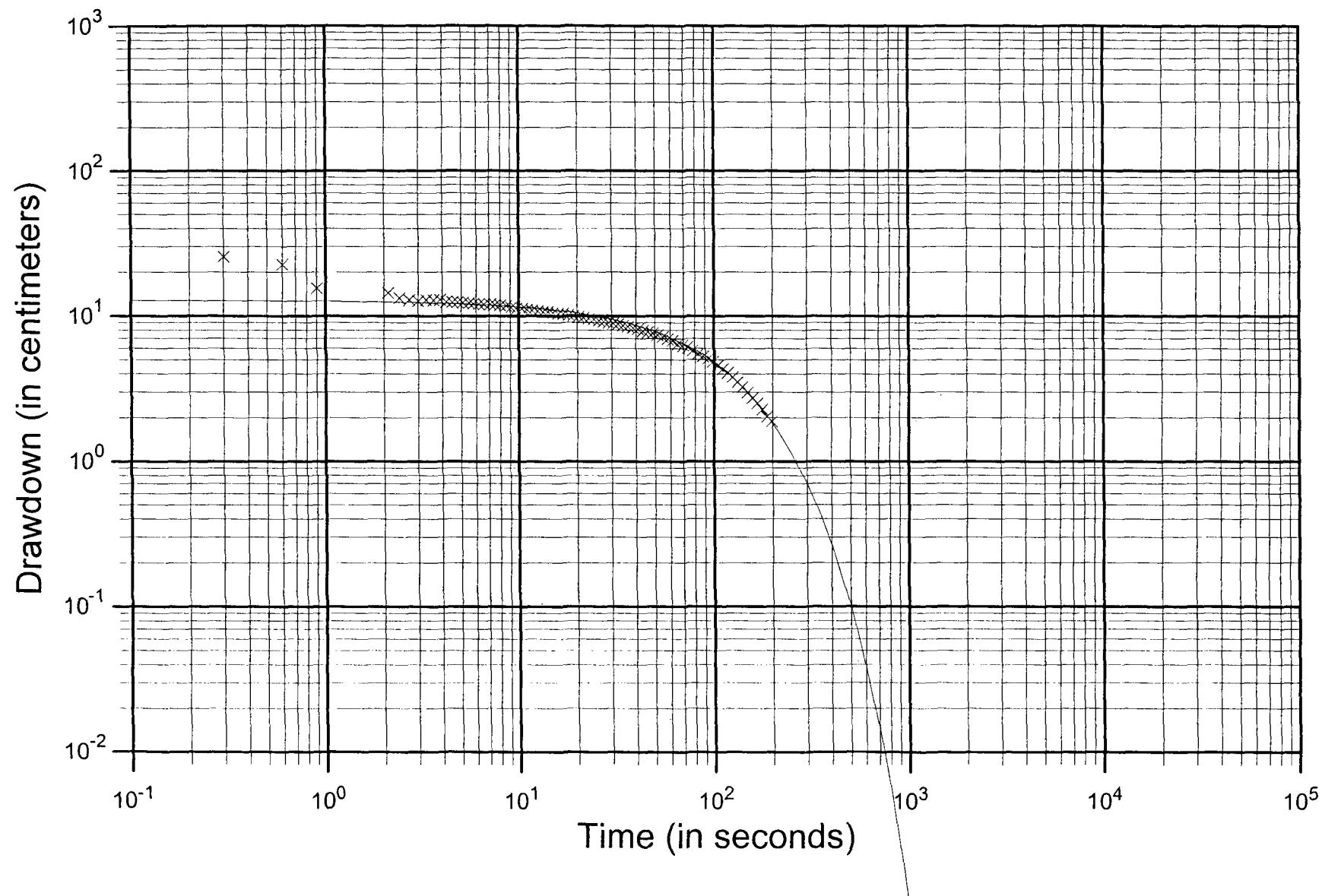
Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	10:07:33	44.3	53.69	0.119	43.4	3.63
5/29/2003	10:07:35	46.9	53.71	0.113	46.0	3.44
5/29/2003	10:07:38	49.7	53.69	0.109	48.8	3.32
5/29/2003	10:07:41	52.6	53.69	0.104	51.7	3.17
5/29/2003	10:07:44	55.7	53.69	0.1	54.8	3.05
5/29/2003	10:07:47	59	53.69	0.096	58.1	2.93
5/29/2003	10:07:51	62.5	53.69	0.09	61.6	2.74
5/29/2003	10:07:55	66.2	53.69	0.086	65.3	2.62
5/29/2003	10:07:59	70.1	53.69	0.082	69.2	2.50
5/29/2003	10:08:03	74.3	53.69	0.08	73.4	2.44
5/29/2003	10:08:07	78.7	53.66	0.077	77.8	2.35
5/29/2003	10:08:12	83.4	53.66	0.073	82.5	2.23
5/29/2003	10:08:17	88.4	53.66	0.065	87.5	1.98
5/29/2003	10:08:22	93.7	53.66	0.065	92.8	1.98
5/29/2003	10:08:28	99.3	53.66	0.064	98.4	1.95
5/29/2003	10:08:34	105.2	53.66	0.058	104.3	1.77
5/29/2003	10:08:40	111.5	53.66	0.054	110.6	1.65
5/29/2003	10:08:47	118.1	53.66	0.05	117.2	1.52
5/29/2003	10:08:54	125.1	53.64	0.05	124.2	1.52
5/29/2003	10:09:01	132.6	53.64	0.047	131.7	1.43
5/29/2003	10:09:09	140.5	53.64	0.045	139.6	1.37
5/29/2003	10:09:17	148.9	53.64	0.041	148.0	1.25
5/29/2003	10:09:26	157.8	53.64	0.039	156.9	1.19
5/29/2003	10:09:36	167.2	53.64	0.037	166.3	1.13
5/29/2003	10:09:46	177.2	53.64	0.033	176.3	1.01
5/29/2003	10:09:56	187.8	53.62	0.031	186.9	0.94
5/29/2003	10:10:07	199	53.62	0.03	198.1	0.91
5/29/2003	10:10:19	210.9	53.62	0.028	210.0	0.85
5/29/2003	10:10:32	223.5	53.62	0.026	222.6	0.79
5/29/2003	10:10:45	236.8	53.62	0.026	235.9	0.79

MW1103S Falling Head Slug Test

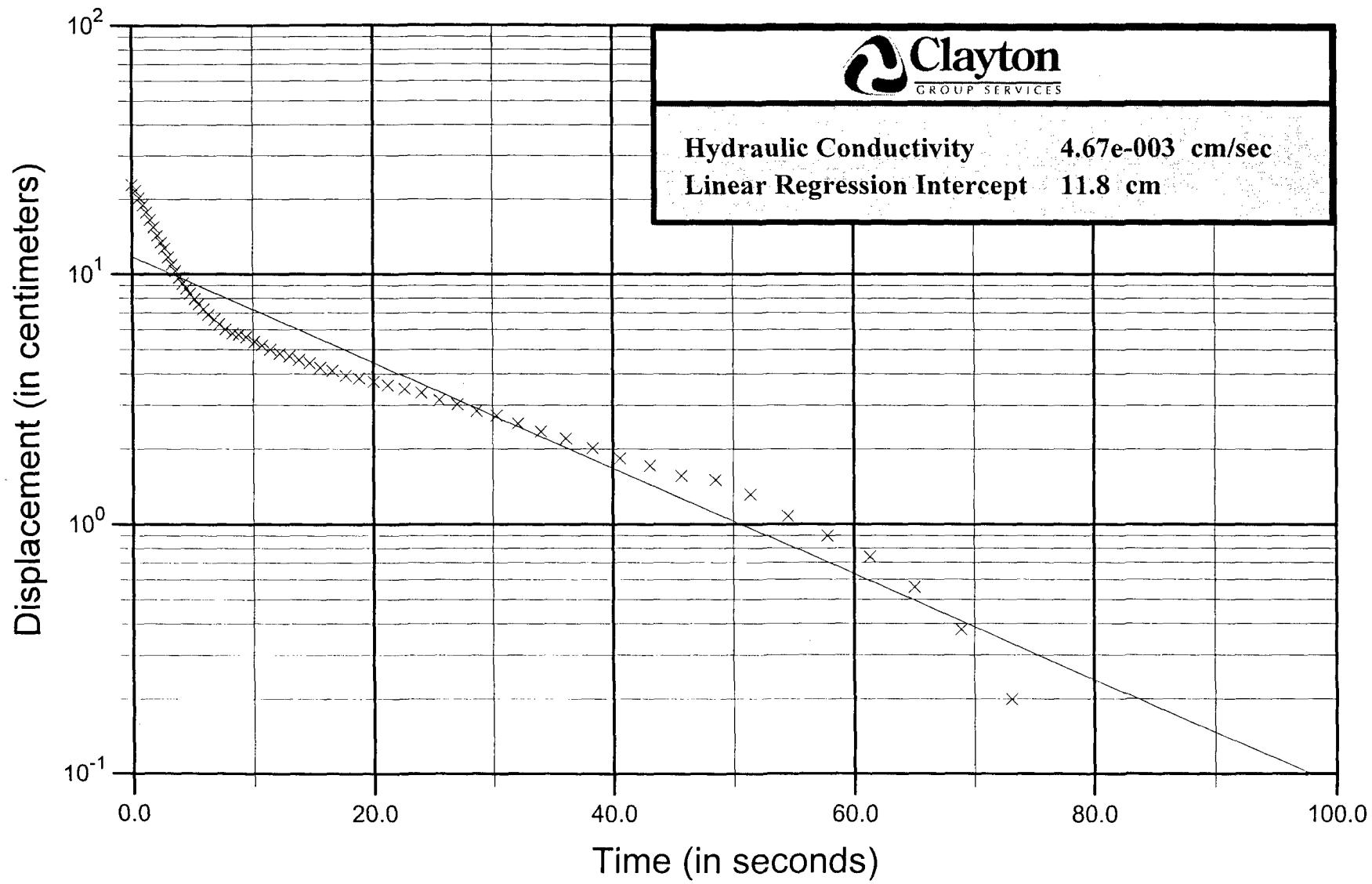


Bouwer and Rice Method (1976)

MW1103S FH (Plot vs. Predicted Curve)

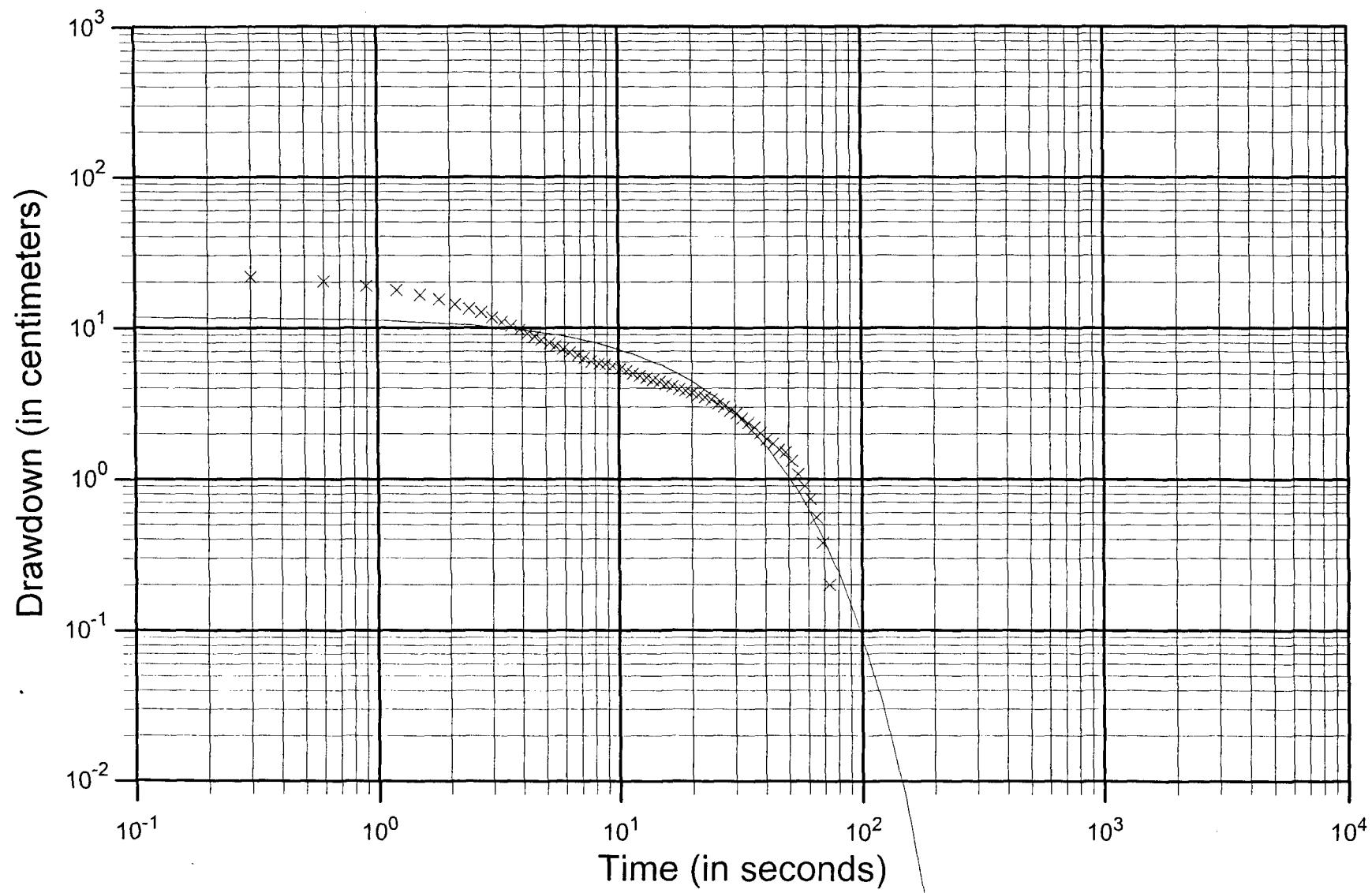


MW1103S Rising Head Slug Test

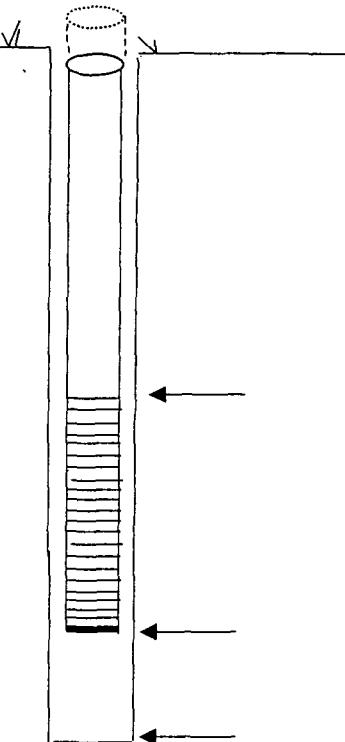


Bouwer and Rice Method (1976)

MW1103S RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION									
Project Name	Lockformer Lisle, IL			Well ID	MW-1103S				
Project No.	15-65263.01-001			Test Date	5/28/2003				
Field Personnel	D. Lamsma, D. Frieling				Unconfined				
EQUIPMENT INFORMATION					ILLUSTRATION OF INFORMATION				
Data Logger Type / Model No.	In-Situ								
Transducer Type / Model No.	Minitroll #5914								
Slug Length / Volume	2 feet / 0.18 gallons								
GENERAL INFORMATION									
Static Groundwater Elevation	653.72 ft MSL								
Ground Surface Elevation	694.2 ft MSL								
Top of Casing Elevation	696.85 ft MSL								
Well Stick-up	2.65	ft	80.8	cm					
Depth to Water	43.13	ft	1314.6	cm					
Diameter of Well Casing	2	in	5.1	cm					
Diameter of Borehole at Screen	8	in	20.3	cm					
Screen Interval	36.0 - 46.0	ft BG	1097 - 1402	cm BG					
Screen Length	10	ft	304.8	cm					
Base of Boring	46	ft BG	1402.1	cm BG					
Base of Upper Confining Unit	---	ft BG	0.0	cm BG					
Top of Lower Confining Unit	---	ft BG	0.0	cm BG					
Saturated Thickness (b)	7	ft	213.4	cm					
Static Height of Water in Well	4.79	ft	146.0	cm					
Geology of Aquifer	Sand								
SLUG TEST MEASUREMENT INFORMATION									
Parameter		Falling Head		Rising Head					
Initial Water Level Above Transducer	3	ft	91.44	cm	3	ft	91.44	cm	
Initial Drawdown/Recovery	1.01	ft	30.85	cm	0.65	ft	19.96	cm	
SLUG TEST RESULTS									
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units				
Notes:									

In-Situ Inc. MiniTroll Pro
 Report generated: 5/28/2003 16:44:29
 Report from file: ...\\SN05914 2003-05-28 100347 MW1103S FH .bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL
 Test name: MW1103S FH
 Test defined on: 5/28/2003 9:56:32
 Test started on: 5/28/2003 10:03:47
 Test stopped on: 5/28/2003 10:07:16
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 82
 TOTAL DATA SAMPLES 82
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: Surface
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 4.479 Feet H2O

Slug Size: 2 ft x 1.5 in

Depth to water (bgs)=40.48'

Screen length (amount exposed to aquifer)=3.52'

Aquifer thickness=3.52'

Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
	5/28/2003	10:03:47	0	53.59	0	-0.9
	5/28/2003	10:03:47	0.3	53.64	0.113	-0.6
	5/28/2003	10:03:47	0.6	53.64	0.584	-0.3
	5/28/2003	10:03:48	0.9	53.64	1.012	0.0
	5/28/2003	10:03:48	1.2	53.64	0.838	0.3
	5/28/2003	10:03:48	1.5	53.66	0.74	0.6

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/28/2003	10:03:49	1.8	53.66	0.509	0.9	15.51
5/28/2003	10:03:49	2.1	53.66	0.372		
5/28/2003	10:03:49	2.4	53.66	0.263		
5/28/2003	10:03:50	2.7	53.66	0.353		
5/28/2003	10:03:50	3	53.66	0.474	2.1	14.45
5/28/2003	10:03:50	3.3	53.66	0.436	2.4	13.29
5/28/2003	10:03:50	3.6	53.66	0.424	2.7	12.92
5/28/2003	10:03:51	3.9	53.66	0.415	3.0	12.65
5/28/2003	10:03:51	4.2	53.66	0.424	3.3	12.92
5/28/2003	10:03:51	4.5	53.66	0.422	3.6	12.86
5/28/2003	10:03:52	4.8	53.66	0.426	3.9	12.98
5/28/2003	10:03:52	5.1	53.66	0.411	4.2	12.53
5/28/2003	10:03:52	5.4	53.66	0.407	4.5	12.41
5/28/2003	10:03:53	5.7	53.66	0.407	4.8	12.41
5/28/2003	10:03:53	6	53.66	0.405	5.1	12.34
5/28/2003	10:03:53	6.4	53.66	0.403	5.5	12.28
5/28/2003	10:03:54	6.7	53.66	0.399	5.8	12.16
5/28/2003	10:03:54	7.1	53.66	0.397	6.2	12.10
5/28/2003	10:03:54	7.5	53.69	0.395	6.6	12.04
5/28/2003	10:03:55	8	53.69	0.395	7.1	12.04
5/28/2003	10:03:55	8.4	53.66	0.392	7.5	11.95
5/28/2003	10:03:56	8.9	53.69	0.389	8.0	11.86
5/28/2003	10:03:56	9.5	53.69	0.386	8.6	11.77
5/28/2003	10:03:57	10	53.66	0.376	9.1	11.46
5/28/2003	10:03:57	10.6	53.66	0.37	9.7	11.28
5/28/2003	10:03:58	11.3	53.66	0.369	10.4	11.25
5/28/2003	10:03:59	11.9	53.66	0.363	11.0	11.06
5/28/2003	10:03:59	12.6	53.66	0.359	11.7	10.94
5/28/2003	10:04:00	13.4	53.66	0.355	12.5	10.82
5/28/2003	10:04:01	14.2	53.66	0.351	13.3	10.70
5/28/2003	10:04:02	15	53.66	0.351	14.1	10.70
5/28/2003	10:04:03	15.9	53.66	0.345	15.0	10.52
5/28/2003	10:04:04	16.8	53.64	0.342	15.9	10.42
5/28/2003	10:04:05	17.8	53.64	0.34	16.9	10.36
5/28/2003	10:04:06	18.9	53.66	0.334	18.0	10.18
5/28/2003	10:04:07	20	53.66	0.33	19.1	10.06
5/28/2003	10:04:08	21.2	53.64	0.325	20.3	9.91
5/28/2003	10:04:09	22.4	53.66	0.32	21.5	9.75
5/28/2003	10:04:11	23.8	53.66	0.315	22.9	9.60
5/28/2003	10:04:12	25.2	53.66	0.311	24.3	9.48
5/28/2003	10:04:14	26.7	53.66	0.305	25.8	9.30
5/28/2003	10:04:15	28.2	53.66	0.301	27.3	9.17
5/28/2003	10:04:17	29.8	53.66	0.295	28.9	8.99
5/28/2003	10:04:18	31.5	53.66	0.292	30.6	8.90
5/28/2003	10:04:20	33.3	53.66	0.288	32.4	8.78
5/28/2003	10:04:22	35.2	53.64	0.282	34.3	8.60
5/28/2003	10:04:24	37.3	53.66	0.278	36.4	8.47
5/28/2003	10:04:26	39.5	53.66	0.272	38.6	8.29
5/28/2003	10:04:29	41.8	53.66	0.267	40.9	8.14

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/28/2003	10:04:31	44.3	53.64	0.259	43.4	7.89
5/28/2003	10:04:34	46.9	53.64	0.255	46.0	7.77
5/28/2003	10:04:37	49.7	53.64	0.25	48.8	7.62
5/28/2003	10:04:39	52.6	53.64	0.244	51.7	7.44
5/28/2003	10:04:43	55.7	53.64	0.236	54.8	7.19
5/28/2003	10:04:46	59	53.64	0.228	58.1	6.95
5/28/2003	10:04:49	62.5	53.64	0.223	61.6	6.80
5/28/2003	10:04:53	66.2	53.64	0.211	65.3	6.43
5/28/2003	10:04:57	70.1	53.64	0.205	69.2	6.25
5/28/2003	10:05:01	74.3	53.64	0.2	73.4	6.10
5/28/2003	10:05:06	78.7	53.64	0.19	77.8	5.79
5/28/2003	10:05:10	83.4	53.64	0.18	82.5	5.49
5/28/2003	10:05:15	88.4	53.64	0.173	87.5	5.27
5/28/2003	10:05:21	93.7	53.62	0.167	92.8	5.09
5/28/2003	10:05:26	99.3	53.62	0.159	98.4	4.85
5/28/2003	10:05:32	105.2	53.62	0.15	104.3	4.57
5/28/2003	10:05:38	111.5	53.62	0.142	110.6	4.33
5/28/2003	10:05:45	118.1	53.62	0.134	117.2	4.08
5/28/2003	10:05:52	125.1	53.62	0.125	124.2	3.81
5/28/2003	10:05:59	132.6	53.62	0.115	131.7	3.51
5/28/2003	10:06:07	140.5	53.62	0.107	139.6	3.26
5/28/2003	10:06:16	148.9	53.59	0.098	148.0	2.99
5/28/2003	10:06:25	157.8	53.59	0.09	156.9	2.74
5/28/2003	10:06:34	167.2	53.59	0.083	166.3	2.53
5/28/2003	10:06:44	177.2	53.59	0.075	176.3	2.29
5/28/2003	10:06:55	187.8	53.59	0.067	186.9	2.04
5/28/2003	10:07:06	199	53.59	0.062	198.1	1.89

In-Situ Inc. MiniTroll Pro
 Report generated: 5/28/2003 16:45:42
 Report from file: ...\\SN05914 2003-05-28 101100 MW1103S RH.bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL
 Test name: MW1103S RH
 Test defined on: 5/28/2003 10:08:16
 Test started on: 5/28/2003 10:11:00
 Test stopped on: 5/28/2003 10:12:18
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 65
 TOTAL DATA SAMPLES 65
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 4.225 Feet H2O

Not enough displacement and the values
 range from positive to negative. Data not
 usable

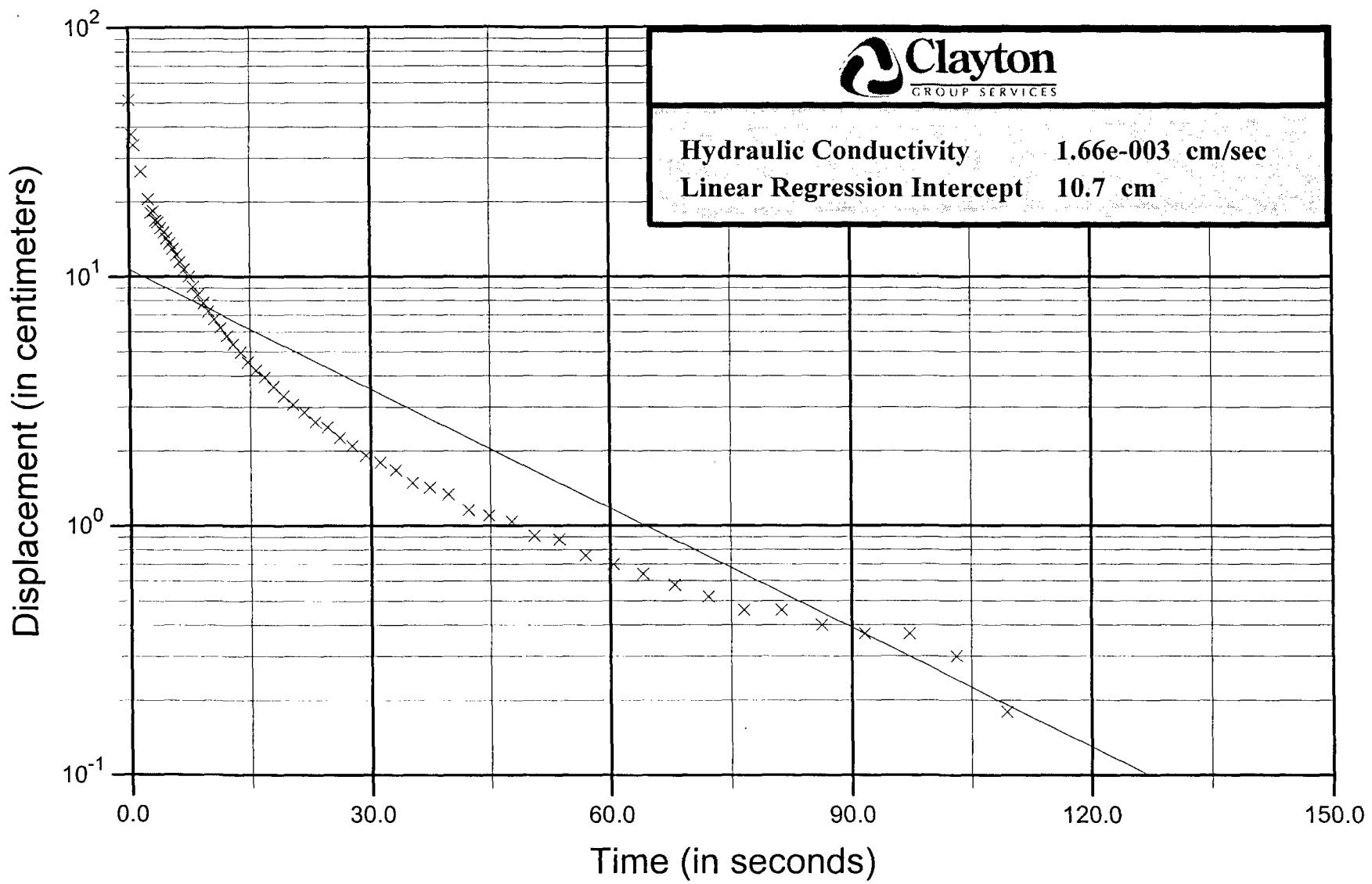
Slug Size: 2 ft x 1.5 in
Depth to water (bgs)=40.48'
Screen length (amount exposed to aquifer)=3.52'
Aquifer thickness=3.52'
Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/28/2003	10:11:00	0	53.55	0	-1.2	0.00
5/28/2003	10:11:00	0.3	53.57	0.066	-0.9	2.01
5/28/2003	10:11:00	0.6	53.59	0.16	-0.6	4.88
5/28/2003	10:11:00	0.9	53.59	0.541	-0.3	16.49
5/28/2003	10:11:01	1.2	53.59	0.655	0.0	19.96
5/28/2003	10:11:01	1.5	53.59	0.613	0.3	18.68

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/28/2003	10:11:01	1.8	53.62	0.567	0.6	17.28
5/28/2003	10:11:02	2.1	53.62	0.524	0.9	15.97
5/28/2003	10:11:02	2.4	53.59	0.484	1.2	14.75
5/28/2003	10:11:02	2.7	53.62	0.444	1.5	13.53
5/28/2003	10:11:03	3	53.62	0.409	1.8	12.47
5/28/2003	10:11:03	3.3	53.62	0.371	2.1	11.31
5/28/2003	10:11:03	3.6	53.62	0.342	2.4	10.42
5/28/2003	10:11:03	3.9	53.62	0.319	2.7	9.72
5/28/2003	10:11:04	4.2	53.62	0.286	3.0	8.72
5/28/2003	10:11:04	4.5	53.62	0.261	3.3	7.96
5/28/2003	10:11:04	4.8	53.62	0.24	3.6	7.32
5/28/2003	10:11:05	5.1	53.62	0.22	3.9	6.71
5/28/2003	10:11:05	5.4	53.62	0.203	4.2	6.19
5/28/2003	10:11:05	5.7	53.62	0.19	4.5	5.79
5/28/2003	10:11:06	6	53.62	0.176	4.8	5.36
5/28/2003	10:11:06	6.4	53.62	0.163	5.2	4.97
5/28/2003	10:11:06	6.7	53.62	0.151	5.5	4.60
5/28/2003	10:11:07	7.1	53.62	0.14	5.9	4.27
5/28/2003	10:11:07	7.5	53.62	0.128	6.3	3.90
5/28/2003	10:11:07	8	53.62	0.118	6.8	3.60
5/28/2003	10:11:08	8.4	53.62	0.109	7.2	3.32
5/28/2003	10:11:08	8.9	53.64	0.099	7.7	3.02
5/28/2003	10:11:09	9.5	53.64	0.092	8.3	2.80
5/28/2003	10:11:10	10	53.62	0.09	8.8	2.74
5/28/2003	10:11:10	10.6	53.62	0.086	9.4	2.62
5/28/2003	10:11:11	11.3	53.59	0.078	10.1	2.38
5/28/2003	10:11:11	11.9	53.62	0.072	10.7	2.19
5/28/2003	10:11:12	12.6	53.62	0.066	11.4	2.01
5/28/2003	10:11:13	13.4	53.59	0.06	12.2	1.83
5/28/2003	10:11:14	14.2	53.59	0.056	13.0	1.71
5/28/2003	10:11:14	15	53.59	0.051	13.8	1.55
5/28/2003	10:11:15	15.9	53.62	0.047	14.7	1.43
5/28/2003	10:11:16	16.8	53.59	0.041	15.6	1.25
5/28/2003	10:11:17	17.8	53.59	0.037	16.6	1.13
5/28/2003	10:11:18	18.9	53.59	0.031	17.7	0.94
5/28/2003	10:11:20	20	53.62	0.028	18.8	0.85
5/28/2003	10:11:21	21.2	53.62	0.024	20.0	0.73
5/28/2003	10:11:22	22.4	53.59	0.02	21.2	0.61
5/28/2003	10:11:23	23.8	53.59	0.016	22.6	0.49
5/28/2003	10:11:25	25.2	53.59	0.012	24.0	0.37
5/28/2003	10:11:26	26.7	53.59	0.005	25.5	0.15
5/28/2003	10:11:28	28.2	53.59	0.001	27.0	0.03
5/28/2003	10:11:29	29.8	53.59	-0.005	28.6	-0.15
5/28/2003	10:11:31	31.5	53.59	-0.009	30.3	-0.27
5/28/2003	10:11:33	33.3	53.59	-0.015	32.1	-0.46
5/28/2003	10:11:35	35.2	53.59	-0.021	34.0	-0.64
5/28/2003	10:11:37	37.3	53.59	-0.026	36.1	-0.79
5/28/2003	10:11:39	39.5	53.59	-0.032	38.3	-0.98
5/28/2003	10:11:41	41.8	53.59	-0.038	40.6	-1.16

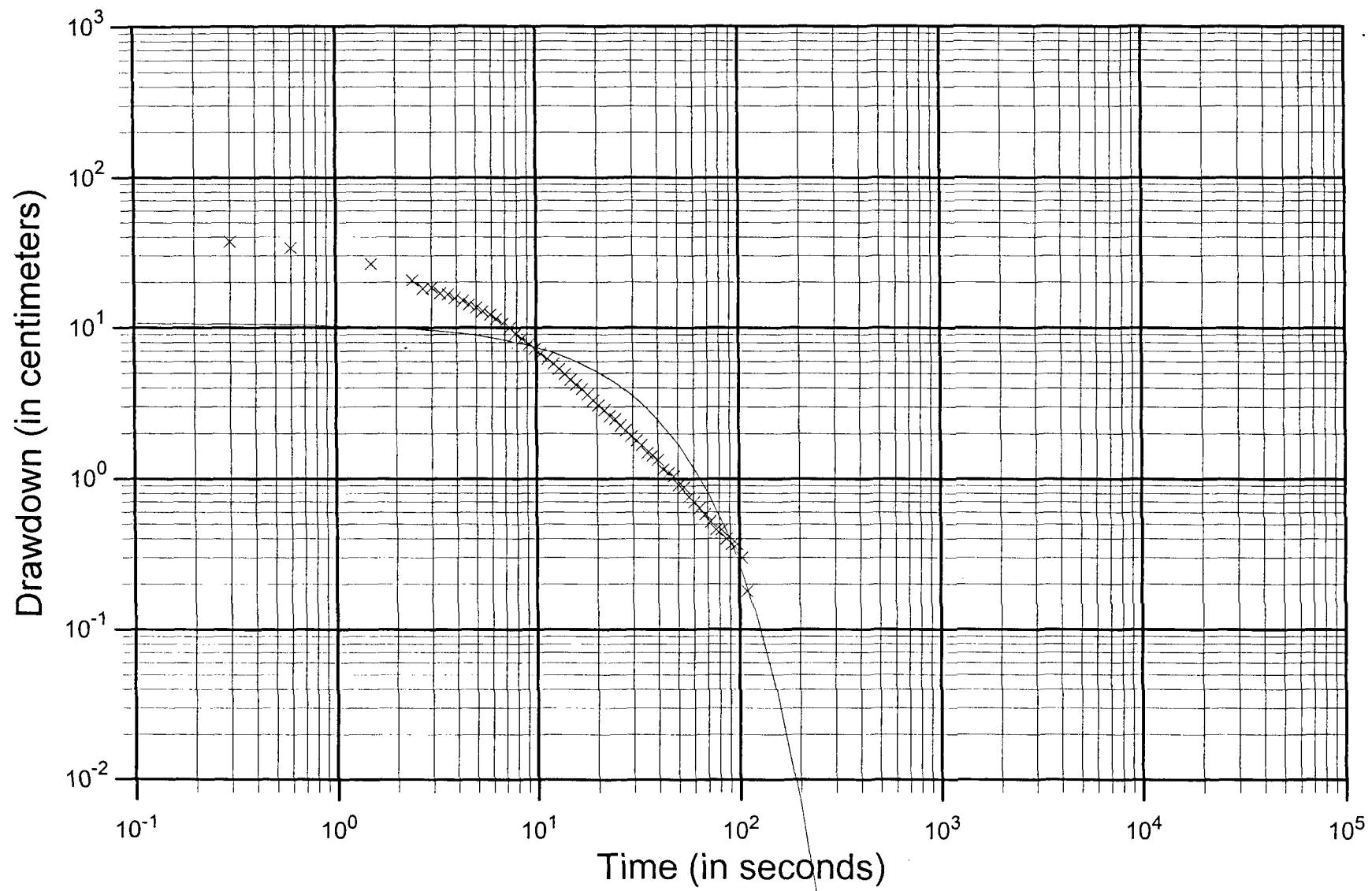
Date	Time	ET (sec)	Chan[1]		Chan[2]	
			Fahrenheit	Feet H2O	Time (sec)	Head (cm)
5/28/2003	10:11:44	44.3	53.59	-0.042	43.1	-1.28
5/28/2003	10:11:46	46.9	53.59	-0.047	45.7	-1.43
5/28/2003	10:11:49	49.7	53.59	-0.049	48.5	-1.49
5/28/2003	10:11:52	52.6	53.59	-0.055	51.4	-1.68
5/28/2003	10:11:55	55.7	53.59	-0.063	54.5	-1.92
5/28/2003	10:11:58	59	53.59	-0.069	57.8	-2.10
5/28/2003	10:12:02	62.5	53.59	-0.074	61.3	-2.26
5/28/2003	10:12:06	66.2	53.59	-0.08	65.0	-2.44
5/28/2003	10:12:10	70.1	53.59	-0.086	68.9	-2.62
5/28/2003	10:12:14	74.3	53.59	-0.092	73.1	-2.80

MW1109 Falling Head Slug Test

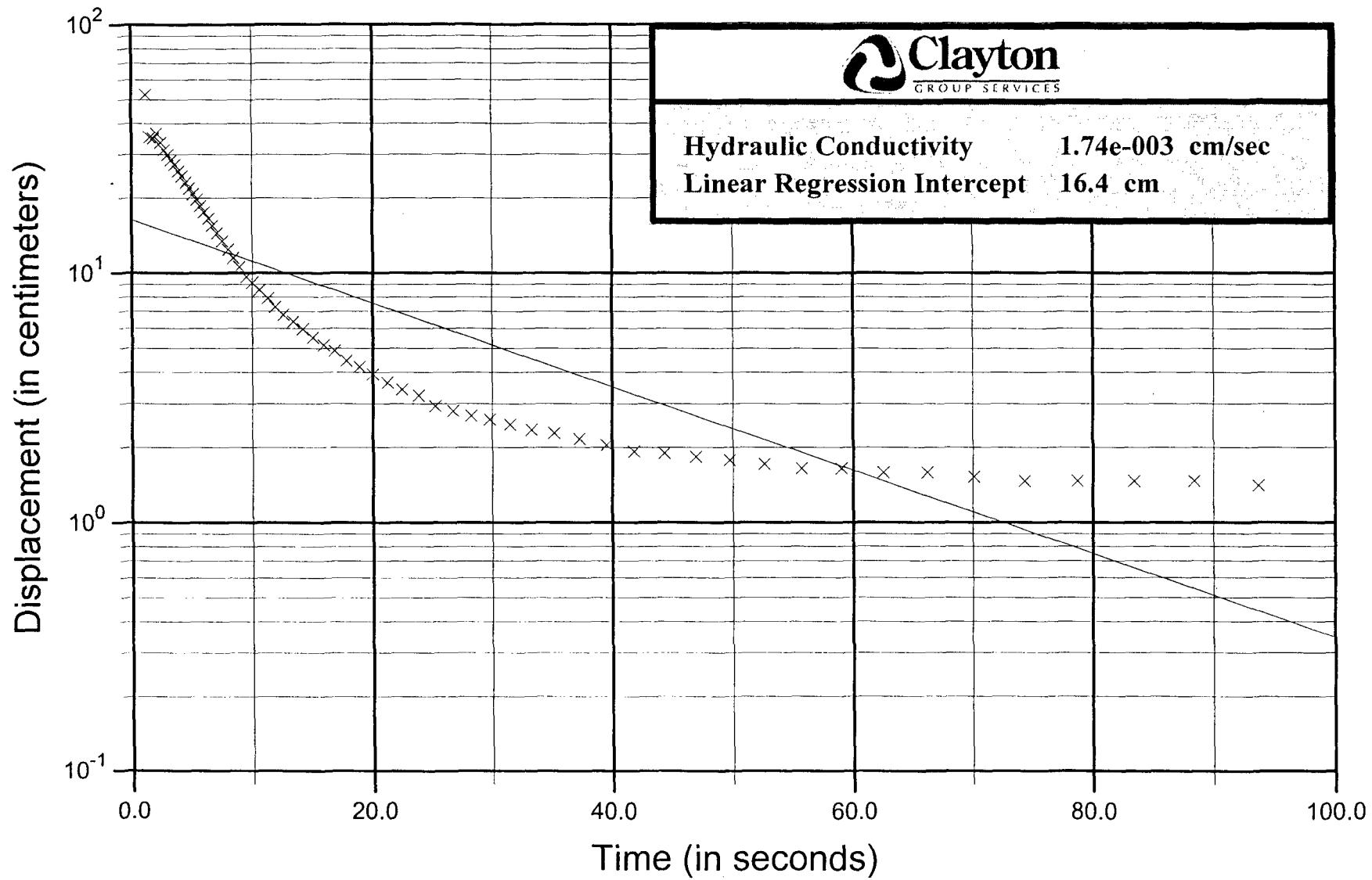


Bouwer and Rice Method (1976)

MW1109 FH (Plot vs. Predicted Curve)

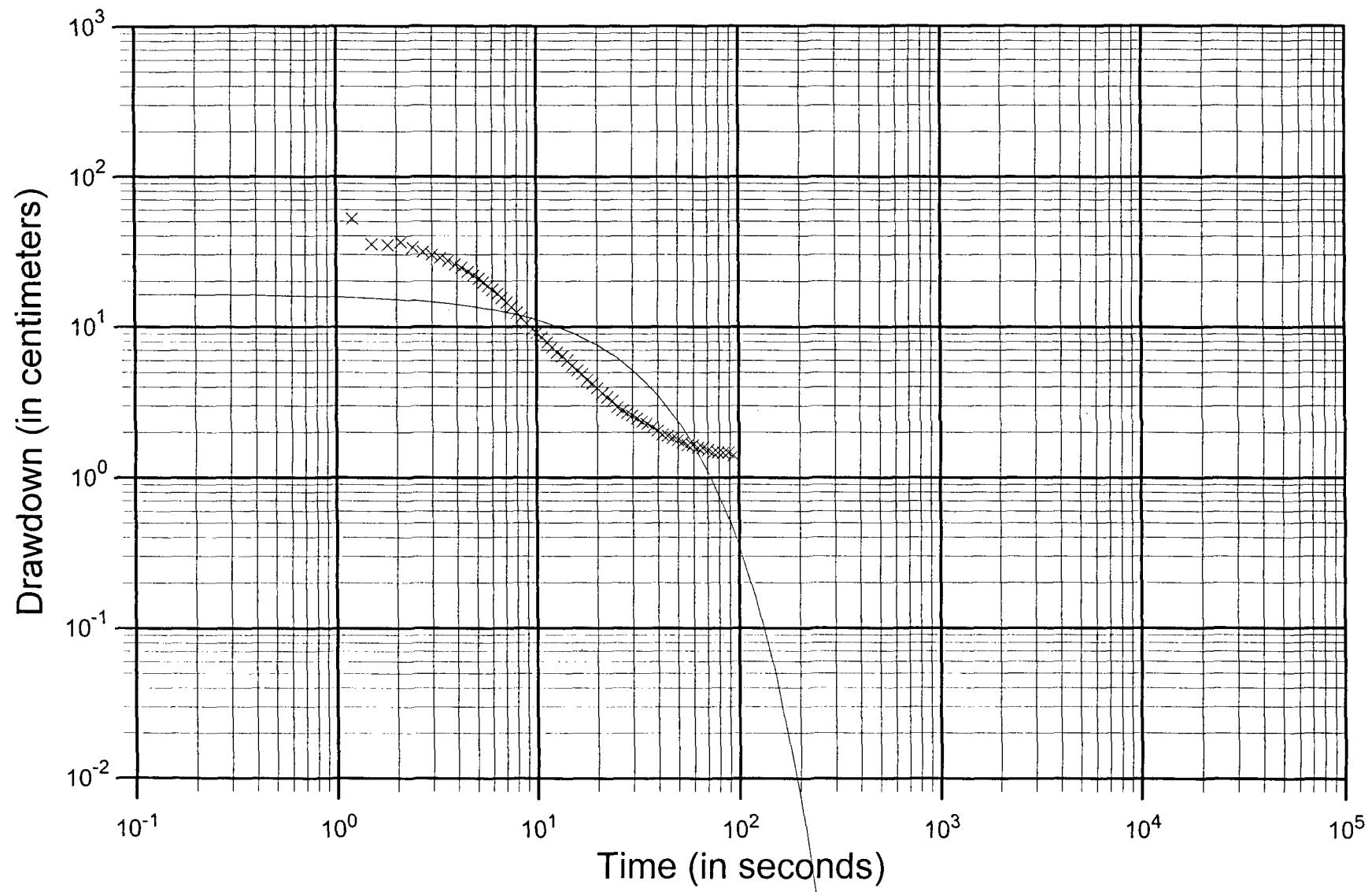


MW1109 Rising Head Slug Test

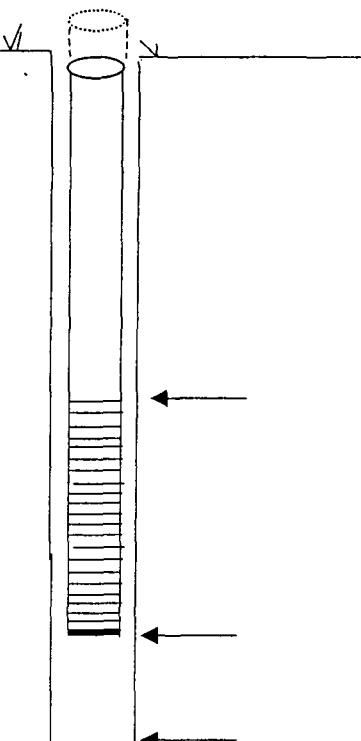


Bouwer and Rice Method (1976)

MW1109 RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION								
Project Name	Lockformer	Lisle, IL	Well ID	MW-1109				
Project No.	15-65263.01-001		Test Date	5/29/2003				
Field Personnel	D. Lamsma, K. Woloszyn		Unconfined					
EQUIPMENT INFORMATION				ILLUSTRATION OF INFORMATION				
Data Logger Type / Model No.	In-Situ							
Transducer Type / Model No.	Minitroll #5914							
Slug Length / Volume	3 feet / 0.28 gallons							
GENERAL INFORMATION								
Static Groundwater Elevation	653.91	ft MSL						
Ground Surface Elevation	698.6	ft MSL						
Top of Casing Elevation	701.04	ft MSL						
Well Stick-up	2.44	ft	74.4	cm				
Depth to Water	47.13	ft	1436.5	cm				
Diameter of Well Casing	2	in	5.1	cm				
Diameter of Borehole at Screen	8	in	20.3	cm				
Screen Interval	44.5 - 54.5	ft BG	1356 - 1661	cm BG				
Screen Length	10	ft	304.8	cm				
Base of Boring	55	ft BG	1676.4	cm BG				
Base of Upper Confining Unit	---	ft BG	0.0	cm BG				
Top of Lower Confining Unit	---	ft BG	0.0	cm BG				
Saturated Thickness (b)	9	ft	274.3	cm				
Static Height of Water in Well	9.68	ft	295.0	cm				
Geology of Aquifer	Sand							
SLUG TEST MEASUREMENT INFORMATION								
Parameter	Falling Head			Rising Head				
Initial Water Level Above Transducer	8	ft	243.84	cm	8	ft	243.84	cm
Initial Drawdown/Recovery	1.23	ft	37.49	cm	1.68	ft	51.1	cm
SLUG TEST RESULTS								
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units			
Notes:								

In-Situ Inc. MiniTroll Pro
 Report generated: 5/29/2003 16:41:09
 Report from file: ...\\SN05914 2003-05-29 110112 MW1109 FH.bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL
 Test name: MW1109 FH
 Test defined on: 5/29/2003 11:00:20
 Test started on: 5/29/2003 11:01:12
 Test stopped on: 5/29/2003 11:04:26
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 81
 TOTAL DATA SAMPLES 81
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: Surface
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 7.911 Feet H2O

Slug Size: 3 ft x 1.5 in

Depth to water (bgs)=44.74'

Screen length (amount exposed to aquifer)=9.68'

Aquifer thickness=9.68'

Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
	5/29/2003	11:01:12	0	53.53	0	-2.1
	5/29/2003	11:01:12	0.3	53.55	0.015	-1.8
	5/29/2003	11:01:12	0.6	53.57	0.024	-1.5
	5/29/2003	11:01:12	0.9	53.57	0.044	-1.2
	5/29/2003	11:01:13	1.2	53.57	4.507	-0.9
	5/29/2003	11:01:13	1.5	53.59	3.21	-0.6
						137.37
						97.84

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	11:01:13	1.8	53.59	-1.354	-0.3	-41.27
5/29/2003	11:01:14	2.1	53.57	1.69	0.0	51.51
5/29/2003	11:01:14	2.4	53.59	1.23	0.3	37.49
5/29/2003	11:01:14	2.7	53.59	1.113	0.6	33.92
5/29/2003	11:01:15	3.	53.59	0.518		
5/29/2003	11:01:15	3.3	53.59	0.476		
5/29/2003	11:01:15	3.6	53.59	0.872	1.5	26.58
5/29/2003	11:01:15	3.9	53.59	0.634		
5/29/2003	11:01:16	4.2	53.59	0.653		
5/29/2003	11:01:16	4.5	53.59	0.676	2.4	20.60
5/29/2003	11:01:16	4.8	53.59	0.595	2.7	18.14
5/29/2003	11:01:17	5.1	53.59	0.605	3.0	18.44
5/29/2003	11:01:17	5.4	53.59	0.553	3.3	16.86
5/29/2003	11:01:17	5.7	53.59	0.545	3.6	16.61
5/29/2003	11:01:18	6	53.59	0.515	3.9	15.70
5/29/2003	11:01:18	6.4	53.59	0.495	4.3	15.09
5/29/2003	11:01:18	6.7	53.59	0.468	4.6	14.26
5/29/2003	11:01:19	7.1	53.59	0.447	5.0	13.62
5/29/2003	11:01:19	7.5	53.59	0.424	5.4	12.92
5/29/2003	11:01:19	8	53.59	0.401	5.9	12.22
5/29/2003	11:01:20	8.4	53.59	0.376	6.3	11.46
5/29/2003	11:01:20	8.9	53.59	0.351	6.8	10.70
5/29/2003	11:01:21	9.5	53.59	0.328	7.4	10.00
5/29/2003	11:01:22	10	53.57	0.299	7.9	9.11
5/29/2003	11:01:22	10.6	53.57	0.278	8.5	8.47
5/29/2003	11:01:23	11.3	53.57	0.257	9.2	7.83
5/29/2003	11:01:23	11.9	53.57	0.238	9.8	7.25
5/29/2003	11:01:24	12.6	53.57	0.221	10.5	6.74
5/29/2003	11:01:25	13.4	53.57	0.205	11.3	6.25
5/29/2003	11:01:26	14.2	53.57	0.19	12.1	5.79
5/29/2003	11:01:26	15	53.57	0.176	12.9	5.36
5/29/2003	11:01:27	15.9	53.57	0.163	13.8	4.97
5/29/2003	11:01:28	16.8	53.57	0.149	14.7	4.54
5/29/2003	11:01:29	17.8	53.57	0.138	15.7	4.21
5/29/2003	11:01:30	18.9	53.57	0.13	16.8	3.96
5/29/2003	11:01:32	20	53.57	0.119	17.9	3.63
5/29/2003	11:01:33	21.2	53.57	0.109	19.1	3.32
5/29/2003	11:01:34	22.4	53.57	0.101	20.3	3.08
5/29/2003	11:01:35	23.8	53.57	0.094	21.7	2.87
5/29/2003	11:01:37	25.2	53.57	0.086	23.1	2.62
5/29/2003	11:01:38	26.7	53.57	0.082	24.6	2.50
5/29/2003	11:01:40	28.2	53.57	0.074	26.1	2.26
5/29/2003	11:01:41	29.8	53.57	0.069	27.7	2.10
5/29/2003	11:01:43	31.5	53.57	0.063	29.4	1.92
5/29/2003	11:01:45	33.3	53.57	0.059	31.2	1.80
5/29/2003	11:01:47	35.2	53.57	0.055	33.1	1.68
5/29/2003	11:01:49	37.3	53.57	0.049	35.2	1.49
5/29/2003	11:01:51	39.5	53.57	0.047	37.4	1.43
5/29/2003	11:01:53	41.8	53.55	0.044	39.7	1.34

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	11:01:56	44.3	53.57	0.038	42.2	1.16
5/29/2003	11:01:58	46.9	53.57	0.036	44.8	1.10
5/29/2003	11:02:01	49.7	53.55	0.034	47.6	1.04
5/29/2003	11:02:04	52.6	53.55	0.03	50.5	0.91
5/29/2003	11:02:07	55.7	53.55	0.029	53.6	0.88
5/29/2003	11:02:10	59	53.55	0.025	56.9	0.76
5/29/2003	11:02:14	62.5	53.55	0.023	60.4	0.70
5/29/2003	11:02:18	66.2	53.55	0.021	64.1	0.64
5/29/2003	11:02:22	70.1	53.55	0.019	68.0	0.58
5/29/2003	11:02:26	74.3	53.55	0.017	72.2	0.52
5/29/2003	11:02:30	78.7	53.53	0.015	76.6	0.46
5/29/2003	11:02:35	83.4	53.53	0.015	81.3	0.46
5/29/2003	11:02:40	88.4	53.53	0.013	86.3	0.40
5/29/2003	11:02:45	93.7	53.53	0.012	91.6	0.37
5/29/2003	11:02:51	99.3	53.53	0.012	97.2	0.37
5/29/2003	11:02:57	105.2	53.53	0.01	103.1	0.30
5/29/2003	11:03:03	111.5	53.53	0.006	109.4	0.18
5/29/2003	11:03:10	118.1	53.53	0.008	116.0	0.24
5/29/2003	11:03:17	125.1	53.53	0.006	123.0	0.18
5/29/2003	11:03:24	132.6	53.53	0.006	130.5	0.18
5/29/2003	11:03:32	140.5	53.5	0.006	138.4	0.18
5/29/2003	11:03:40	148.9	53.5	0.006	146.8	0.18
5/29/2003	11:03:49	157.8	53.5	0.002	155.7	0.06
5/29/2003	11:03:59	167.2	53.5	0.006	165.1	0.18
5/29/2003	11:04:09	177.2	53.5	0.004	175.1	0.12
5/29/2003	11:04:19	187.8	53.5	0.004	185.7	0.12

In-Situ Inc. MiniTroll Pro
Report generated: 5/29/2003 16:42:07
Report from file: ...\\SN05914 2003-05-29 110732 MW1109 RH.bin
Win-Situ Version 4.41

Serial number: 5914
Firmware Version 3.07
Unit name: MiniTROLL

Test name: MW1109 RH

Test defined on: 5/29/2003 11:07:10
Test started on: 5/29/2003 11:07:32
Test stopped on: 5/29/2003 11:10:11
Test extracted on: N/A N/A

Data gathered using Logarithmic testing

Maximum time between data points: 600.0 Seconds.
Number of data samples: 78

NOT enough displacement. The values oscillate, and are mostly negative. Data not usable

TOTAL DATA SAMPLES 78

Channel number [1]
Measurement type: Temperature
Channel name: Temperature

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 30 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 6.807 Feet H2O

Slug Size: 3 ft x 1.5 in

Depth to water (bgs)=44.74'

Screen length (amount exposed to aquifer)=9.68'

Aquifer thickness=9.68'

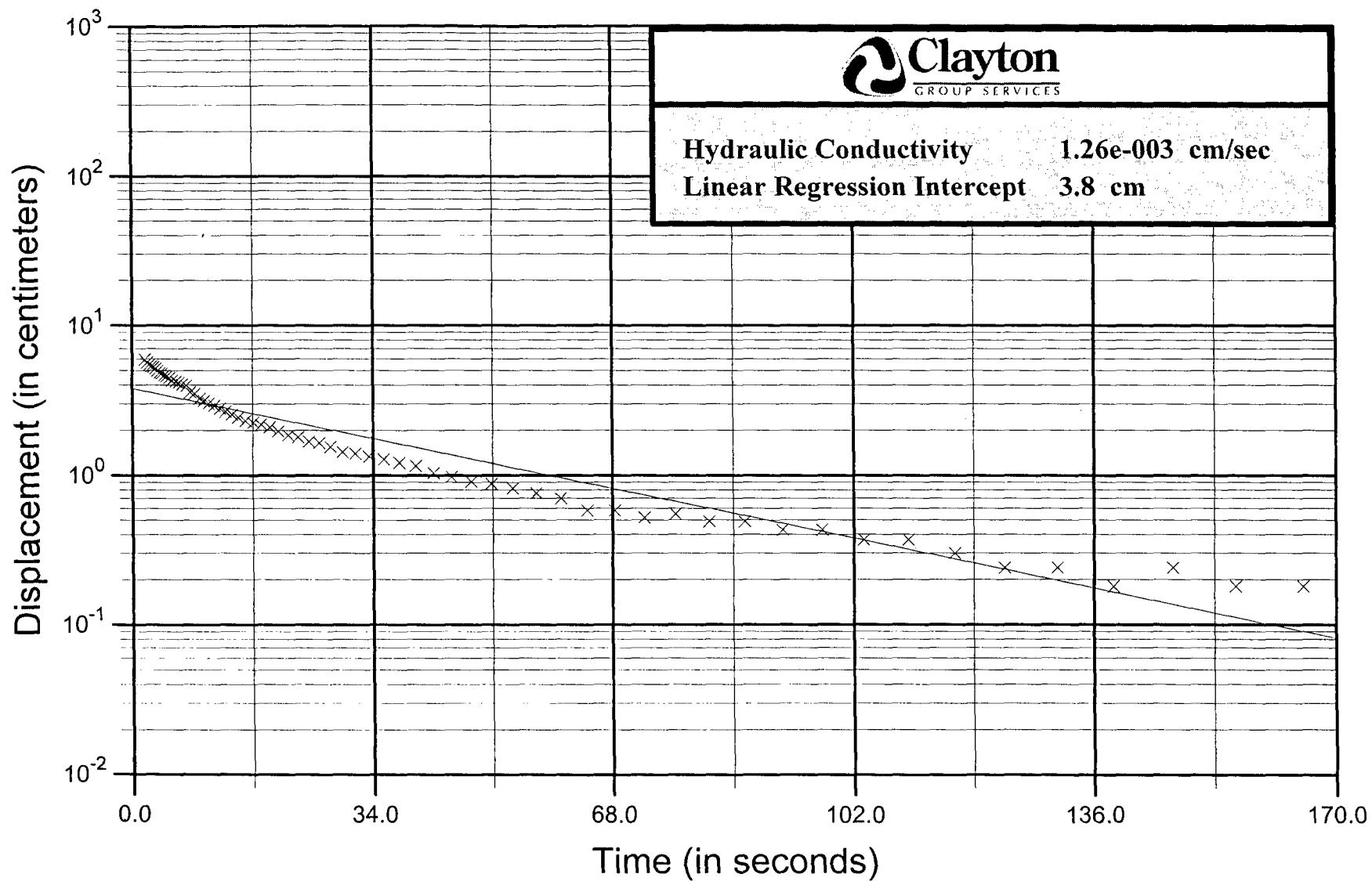
Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	11:07:32	0	53.48	0	-2.1	0.00
5/29/2003	11:07:33	0.3	53.5	-0.142	-1.8	-4.33
5/29/2003	11:07:33	0.6	53.53	-0.128	-1.5	-3.90
5/29/2003	11:07:33	0.9	53.53	-0.223	-1.2	-6.80
5/29/2003	11:07:34	1.2	53.53	0.572	-0.9	17.43
5/29/2003	11:07:34	1.5	53.53	0.008	-0.6	0.24

5/29/2003	11:07:34	1.8	53.53	-0.005	-0.3	-0.15
5/29/2003	11:07:34	2.1	53.53	0.051	0.0	1.55
5/29/2003	11:07:35	2.4	53.53	-0.049	0.3	-1.49
5/29/2003	11:07:35	2.7	53.53	-0.122	0.6	-3.72
5/29/2003	11:07:35	3	53.53	-0.166	0.9	-5.06
5/29/2003	11:07:36	3.3	53.53	-0.211	1.2	-6.43
5/29/2003	11:07:36	3.6	53.53	-0.253	1.5	-7.71
5/29/2003	11:07:36	3.9	53.53	-0.303	1.8	-9.24
5/29/2003	11:07:37	4.2	53.53	-0.343	2.1	-10.45
5/29/2003	11:07:37	4.5	53.53	-0.388	2.4	-11.83
5/29/2003	11:07:37	4.8	53.53	-0.428	2.7	-13.05
5/29/2003	11:07:37	5.1	53.53	-0.465	3.0	-14.17
5/29/2003	11:07:38	5.4	53.53	-0.501	3.3	-15.27
5/29/2003	11:07:38	5.7	53.53	-0.538	3.6	-16.40
5/29/2003	11:07:38	6	53.53	-0.572	3.9	-17.43
5/29/2003	11:07:39	6.4	53.53	-0.605	4.3	-18.44
5/29/2003	11:07:39	6.7	53.53	-0.64	4.6	-19.51
5/29/2003	11:07:39	7.1	53.53	-0.674	5.0	-20.54
5/29/2003	11:07:40	7.5	53.53	-0.707	5.4	-21.55
5/29/2003	11:07:40	8	53.53	-0.74	5.9	-22.56
5/29/2003	11:07:41	8.4	53.53	-0.771	6.3	-23.50
5/29/2003	11:07:41	8.9	53.53	-0.801	6.8	-24.41
5/29/2003	11:07:42	9.5	53.53	-0.832	7.4	-25.36
5/29/2003	11:07:42	10	53.53	-0.848	7.9	-25.85
5/29/2003	11:07:43	10.6	53.53	-0.867	8.5	-26.43
5/29/2003	11:07:44	11.3	53.53	-0.888	9.2	-27.07
5/29/2003	11:07:44	11.9	53.53	-0.908	9.8	-27.68
5/29/2003	11:07:45	12.6	53.53	-0.925	10.5	-28.19
5/29/2003	11:07:46	13.4	53.53	-0.938	11.3	-28.59
5/29/2003	11:07:47	14.2	53.53	-0.952	12.1	-29.02
5/29/2003	11:07:47	15	53.53	-0.967	12.9	-29.47
5/29/2003	11:07:48	15.9	53.53	-0.979	13.8	-29.84
5/29/2003	11:07:49	16.8	53.53	-0.988	14.7	-30.11
5/29/2003	11:07:50	17.8	53.53	-1.002	15.7	-30.54
5/29/2003	11:07:51	18.9	53.53	-1.01	16.8	-30.78
5/29/2003	11:07:52	20	53.53	-1.019	17.9	-31.06
5/29/2003	11:07:54	21.2	53.53	-1.029	19.1	-31.36
5/29/2003	11:07:55	22.4	53.53	-1.036	20.3	-31.58
5/29/2003	11:07:56	23.8	53.53	-1.042	21.7	-31.76
5/29/2003	11:07:58	25.2	53.53	-1.052	23.1	-32.06
5/29/2003	11:07:59	26.7	53.53	-1.056	24.6	-32.19
5/29/2003	11:08:01	28.2	53.53	-1.06	26.1	-32.31
5/29/2003	11:08:02	29.8	53.53	-1.063	27.7	-32.40
5/29/2003	11:08:04	31.5	53.53	-1.067	29.4	-32.52
5/29/2003	11:08:06	33.3	53.53	-1.071	31.2	-32.64
5/29/2003	11:08:08	35.2	53.53	-1.073	33.1	-32.71
5/29/2003	11:08:10	37.3	53.53	-1.077	35.2	-32.83
5/29/2003	11:08:12	39.5	53.53	-1.081	37.4	-32.95
5/29/2003	11:08:14	41.8	53.53	-1.085	39.7	-33.07
5/29/2003	11:08:17	44.3	53.53	-1.086	42.2	-33.10
5/29/2003	11:08:19	46.9	53.53	-1.088	44.8	-33.16
5/29/2003	11:08:22	49.7	53.53	-1.09	47.6	-33.22

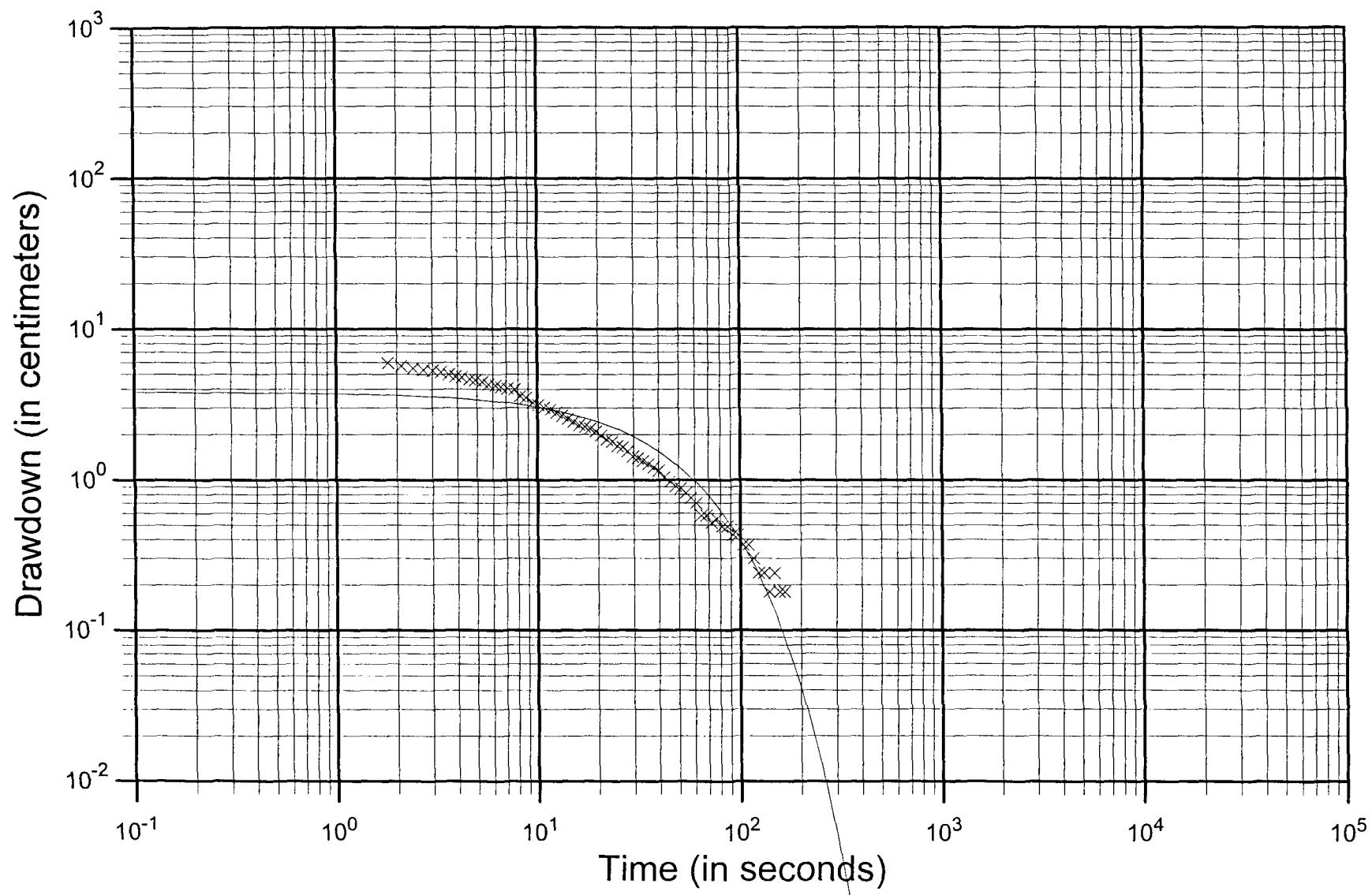
5/29/2003	11:08:25	52.6	53.53	-1.092	50.5	-33.28
5/29/2003	11:08:28	55.7	53.53	-1.094	53.6	-33.35
5/29/2003	11:08:31	59	53.53	-1.094	56.9	-33.35
5/29/2003	11:08:35	62.5	53.5	-1.096	60.4	-33.41
5/29/2003	11:08:39	66.2	53.5	-1.096	64.1	-33.41
5/29/2003	11:08:42	70.1	53.5	-1.098	68.0	-33.47
5/29/2003	11:08:47	74.3	53.5	-1.1	72.2	-33.53
5/29/2003	11:08:51	78.7	53.5	-1.1	76.6	-33.53
5/29/2003	11:08:56	83.4	53.5	-1.1	81.3	-33.53
5/29/2003	11:09:01	88.4	53.5	-1.1	86.3	-33.53
5/29/2003	11:09:06	93.7	53.5	-1.102	91.6	-33.59
5/29/2003	11:09:12	99.3	53.5	-1.104	97.2	-33.65
5/29/2003	11:09:18	105.2	53.5	-1.102	103.1	-33.59
5/29/2003	11:09:24	111.5	53.5	-1.104	109.4	-33.65
5/29/2003	11:09:30	118.1	53.48	-1.104	116.0	-33.65
5/29/2003	11:09:37	125.1	53.48	-1.104	123.0	-33.65
5/29/2003	11:09:45	132.6	53.48	-1.106	130.5	-33.71
5/29/2003	11:09:53	140.5	53.48	-1.106	138.4	-33.71
5/29/2003	11:10:01	148.9	53.48	-1.106	146.8	-33.71
5/29/2003	11:10:10	157.8	53.48	-1.108	155.7	-33.77

MW1117 Falling Head Slug Test

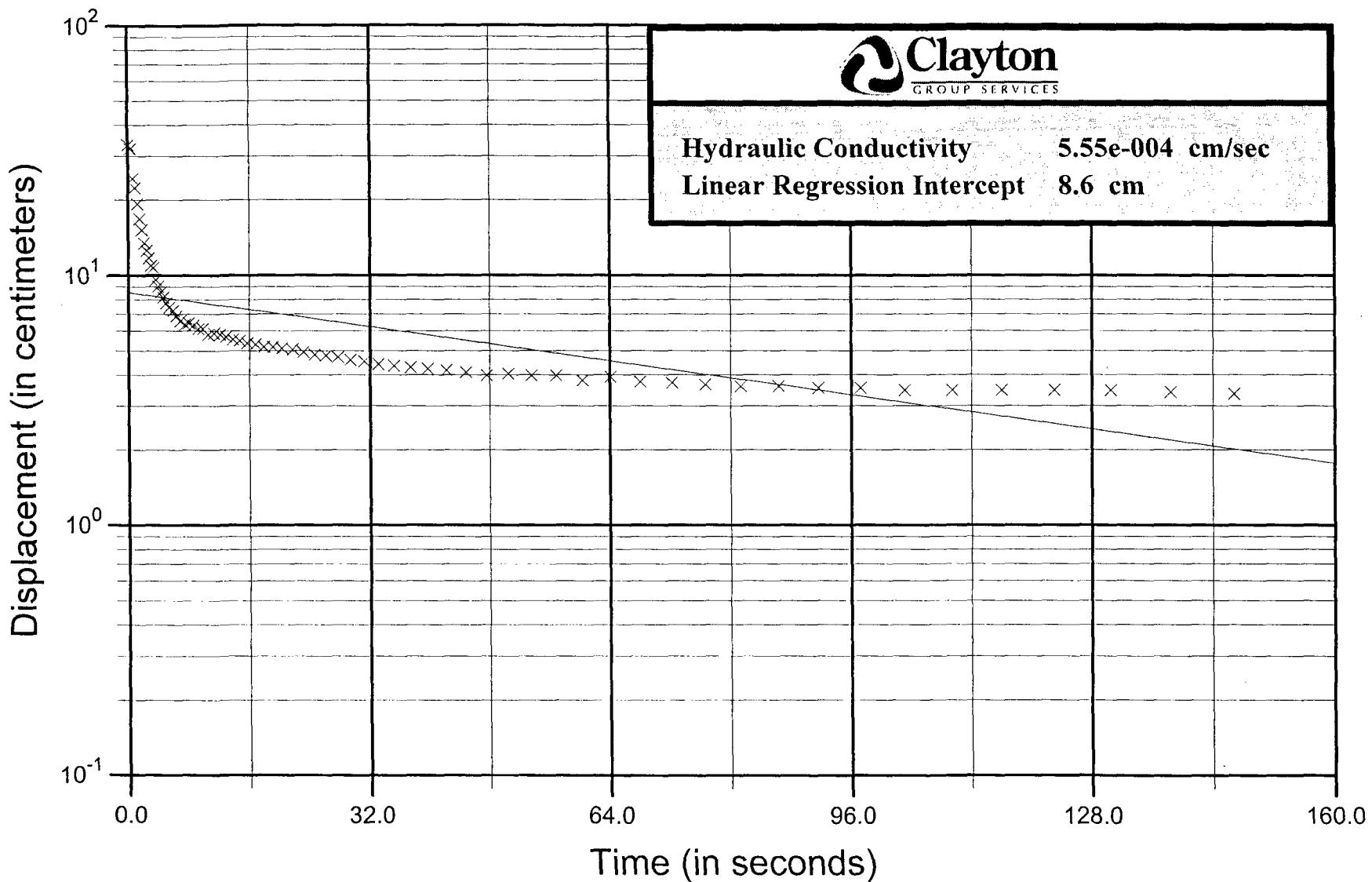


Bouwer and Rice Method (1976)

MW1117 FH (Plot vs. Predicted Curve)

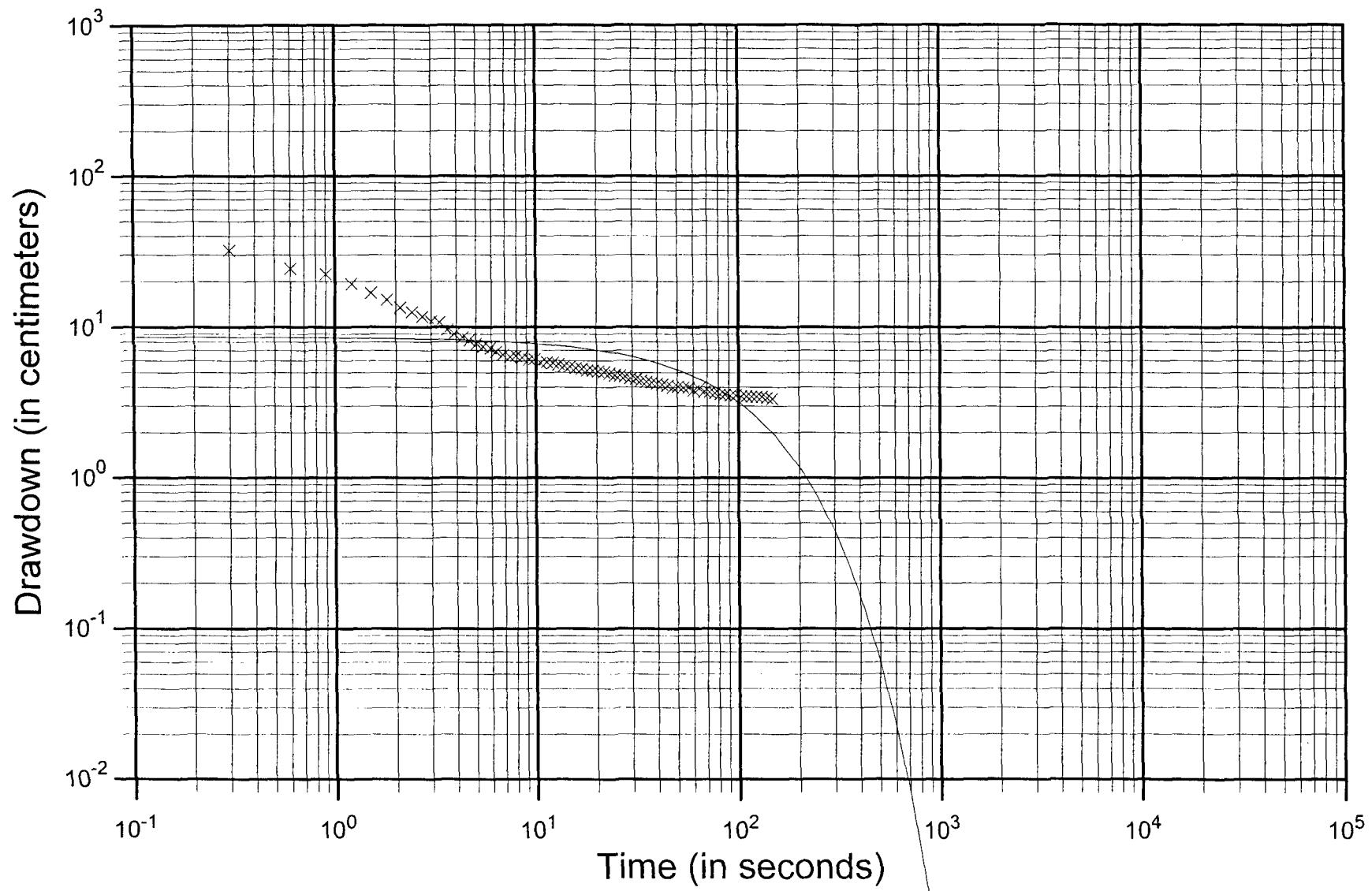


MW1117 Rising Head Slug Test

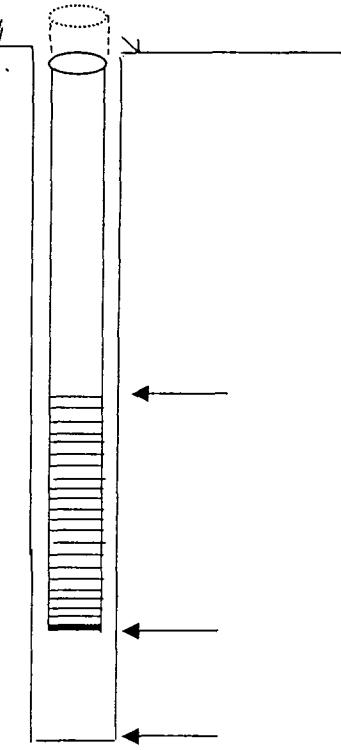


Bouwer and Rice Method (1976)

MW1117 RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION									
Project Name		Lockformer		Lisle, IL					
Project No.		15-65263.01-001		Well ID	MW-1117				
Field Personnel		D. Lamsma, K. Woloszyn		Test Date	5/29/2003				
					Unconfined				
EQUIPMENT INFORMATION					ILLUSTRATION OF INFORMATION				
Data Logger Type / Model No.		In-Situ							
Transducer Type / Model No.		Minitroll #5914							
Slug Length / Volume		3 feet / 0.28 gallons							
GENERAL INFORMATION									
Static Groundwater Elevation		653.555 ft MSL							
Ground Surface Elevation		708.4 ft MSL							
Top of Casing Elevation		711.255 ft MSL							
Well Stick-up		2.855	ft	87.0	cm				
Depth to Water		57.7	ft	1758.7	cm				
Diameter of Well Casing		2	in	5.1	cm				
Diameter of Borehole at Screen		8	in	20.3	cm				
Screen Interval		52.5 - 62.5	ft BG	1600 - 1905	cm BG				
Screen Length		10	ft	304.8	cm				
Base of Boring		65	ft BG	1981.2	cm BG				
Base of Upper Confining Unit		---	ft BG	0.0	cm BG				
Top of Lower Confining Unit		---	ft BG	0.0	cm BG				
Saturated Thickness (b)		8.5	ft	259.1	cm				
Static Height of Water in Well		8.09	ft	246.6	cm				
Geology of Aquifer		Sand							
SLUG TEST MEASUREMENT INFORMATION									
Parameter		Falling Head			Rising Head				
Initial Water Level Above Transducer		7	ft	213.36	cm	7	ft	213.36	cm
Initial Drawdown/Recovery		1.63	ft	49.8	cm	1.10	ft	33.38	cm
SLUG TEST RESULTS									
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units				
<p>Notes:</p> <hr/> <hr/> <hr/> <hr/>									

In-Situ Inc. MiniTroll Pro
Report generated: 5/29/2003 16:49:26
Report from file: ...\\SN05914 2003-05-29 135950 MW1117 FH.bin
Win-Situ Version 4.41

Serial number: 5914
Firmware Version 3.07
Unit name: MiniTROLL

Test name: MW1117 FH

Test defined on: 5/29/2003 13:59:30
Test started on: 5/29/2003 13:59:50
Test stopped on: 5/29/2003 14:02:47
Test extracted on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 600.0 Seconds.
Number of data samples: 79

TOTAL DATA SAMPLES 79

Channel number [1]
Measurement type: Temperature
Channel name: Temperature

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 30 PSIG.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 7.784 Feet H2O

Slug Size: 3 ft x 1.5 in

Depth to water (bgs)=54.7'

Screen length (amount exposed to aquifer)=6.3'

Aquifer thickness=6.3'

Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
	5/29/2003	13:59:50	0	54.03	0	-1.8
	5/29/2003	13:59:50	0.3	54.07	0.015	-1.5
	5/29/2003	13:59:51	0.6	54.07	0.515	-1.2
	5/29/2003	13:59:51	0.9	54.07	1.171	-0.9
	5/29/2003	13:59:51	1.2	54.1	0.74	-0.6
	5/29/2003	13:59:52	1.5	54.1	1.452	-0.3

5/29/2003	13:59:52	1.8	54.1	1.634	0.0	49.80
5/29/2003	13:59:52	2.1	54.1	0.772	0.3	23.53
5/29/2003	13:59:52	2.4	54.1	0.276	0.6	8.41
5/29/2003	13:59:53	2.7	54.1	0.114		
5/29/2003	13:59:53	3	54.1	-0.276		
5/29/2003	13:59:53	3.3	54.1	0.159	1.5	4.85
5/29/2003	13:59:54	3.6	54.1	0.195	1.8	5.94
5/29/2003	13:59:54	3.9	54.1	0.186	2.1	5.67
5/29/2003	13:59:54	4.2	54.1	0.18	2.4	5.49
5/29/2003	13:59:55	4.5	54.1	0.176	2.7	5.36
5/29/2003	13:59:55	4.8	54.1	0.174	3.0	5.30
5/29/2003	13:59:55	5.1	54.1	0.17	3.3	5.18
5/29/2003	13:59:55	5.4	54.1	0.164	3.6	5.00
5/29/2003	13:59:56	5.7	54.1	0.159	3.9	4.85
5/29/2003	13:59:56	6	54.1	0.157	4.2	4.79
5/29/2003	13:59:56	6.4	54.12	0.153	4.6	4.66
5/29/2003	13:59:57	6.7	54.1	0.151	4.9	4.60
5/29/2003	13:59:57	7.1	54.1	0.147	5.3	4.48
5/29/2003	13:59:58	7.5	54.1	0.141	5.7	4.30
5/29/2003	13:59:58	8	54.1	0.139	6.2	4.24
5/29/2003	13:59:58	8.4	54.1	0.136	6.6	4.15
5/29/2003	13:59:59	8.9	54.12	0.133	7.1	4.05
5/29/2003	14:00:00	9.5	54.12	0.131	7.7	3.99
5/29/2003	14:00:00	10	54.1	0.118	8.2	3.60
5/29/2003	14:00:01	10.6	54.07	0.115	8.8	3.51
5/29/2003	14:00:01	11.3	54.07	0.107	9.5	3.26
5/29/2003	14:00:02	11.9	54.07	0.103	10.1	3.14
5/29/2003	14:00:03	12.6	54.07	0.099	10.8	3.02
5/29/2003	14:00:03	13.4	54.07	0.096	11.6	2.93
5/29/2003	14:00:04	14.2	54.07	0.092	12.4	2.80
5/29/2003	14:00:05	15	54.07	0.088	13.2	2.68
5/29/2003	14:00:06	15.9	54.07	0.084	14.1	2.56
5/29/2003	14:00:07	16.8	54.07	0.08	15.0	2.44
5/29/2003	14:00:08	17.8	54.07	0.076	16.0	2.32
5/29/2003	14:00:09	18.9	54.07	0.074	17.1	2.26
5/29/2003	14:00:10	20	54.07	0.072	18.2	2.19
5/29/2003	14:00:11	21.2	54.07	0.069	19.4	2.10
5/29/2003	14:00:13	22.4	54.07	0.065	20.6	1.98
5/29/2003	14:00:14	23.8	54.07	0.061	22.0	1.86
5/29/2003	14:00:15	25.2	54.07	0.059	23.4	1.80
5/29/2003	14:00:17	26.7	54.07	0.055	24.9	1.68
5/29/2003	14:00:18	28.2	54.05	0.054	26.4	1.65
5/29/2003	14:00:20	29.8	54.07	0.051	28.0	1.55
5/29/2003	14:00:22	31.5	54.07	0.047	29.7	1.43
5/29/2003	14:00:23	33.3	54.05	0.046	31.5	1.40
5/29/2003	14:00:25	35.2	54.07	0.044	33.4	1.34
5/29/2003	14:00:27	37.3	54.05	0.042	35.5	1.28
5/29/2003	14:00:30	39.5	54.05	0.04	37.7	1.22
5/29/2003	14:00:32	41.8	54.05	0.038	40.0	1.16
5/29/2003	14:00:34	44.3	54.05	0.034	42.5	1.04
5/29/2003	14:00:37	46.9	54.05	0.032	45.1	0.98
5/29/2003	14:00:40	49.7	54.05	0.03	47.9	0.91

5/29/2003	14:00:43	52.6	54.05	0.029	50.8	0.88
5/29/2003	14:00:46	55.7	54.05	0.027	53.9	0.82
5/29/2003	14:00:49	59	54.03	0.025	57.2	0.76
5/29/2003	14:00:53	62.5	54.03	0.023	60.7	0.70
5/29/2003	14:00:56	66.2	54.03	0.019	64.4	0.58
5/29/2003	14:01:00	70.1	54.03	0.019	68.3	0.58
5/29/2003	14:01:04	74.3	54.03	0.017	72.5	0.52
5/29/2003	14:01:09	78.7	54	0.018	76.9	0.55
5/29/2003	14:01:13	83.4	54	0.016	81.6	0.49
5/29/2003	14:01:18	88.4	54	0.016	86.6	0.49
5/29/2003	14:01:24	93.7	54	0.014	91.9	0.43
5/29/2003	14:01:29	99.3	54	0.014	97.5	0.43
5/29/2003	14:01:35	105.2	53.98	0.012	103.4	0.37
5/29/2003	14:01:42	111.5	53.98	0.012	109.7	0.37
5/29/2003	14:01:48	118.1	53.98	0.01	116.3	0.30
5/29/2003	14:01:55	125.1	53.98	0.008	123.3	0.24
5/29/2003	14:02:03	132.6	53.98	0.008	130.8	0.24
5/29/2003	14:02:11	140.5	53.98	0.006	138.7	0.18
5/29/2003	14:02:19	148.9	53.98	0.008	147.1	0.24
5/29/2003	14:02:28	157.8	53.98	0.006	156.0	0.18
5/29/2003	14:02:37	167.2	53.98	0.006	165.4	0.18

In-Situ Inc. MiniTroll Pro

Report generated: 5/29/2003 16:50:15
 Report from file: ...\\SN05914 2003-05-29 140802 MW1117 RH.bin
 Win-Situ Version 4.41

Serial number: 5914
 Firmware Version 3.07
 Unit name: MiniTROLL

Test name: MW1117 RH

Test defined on: 5/29/2003 14:07:34
 Test started on: 5/29/2003 14:08:02
 Test stopped on: 5/29/2003 14:15:02
 Test extracted on: N/A N/A

Data gathered using Logarithmic testing
 Maximum time between data points: 600.0 Seconds.
 Number of data samples: 94

TOTAL DATA SAMPLES 94

Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature

Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 7.887 Feet H2O

Slug Size: 3 ft x 1.5 in

Depth to water (bgs)=54.7'

Screen length (amount exposed to aquifer)=6.3'

Aquifer thickness=6.3'

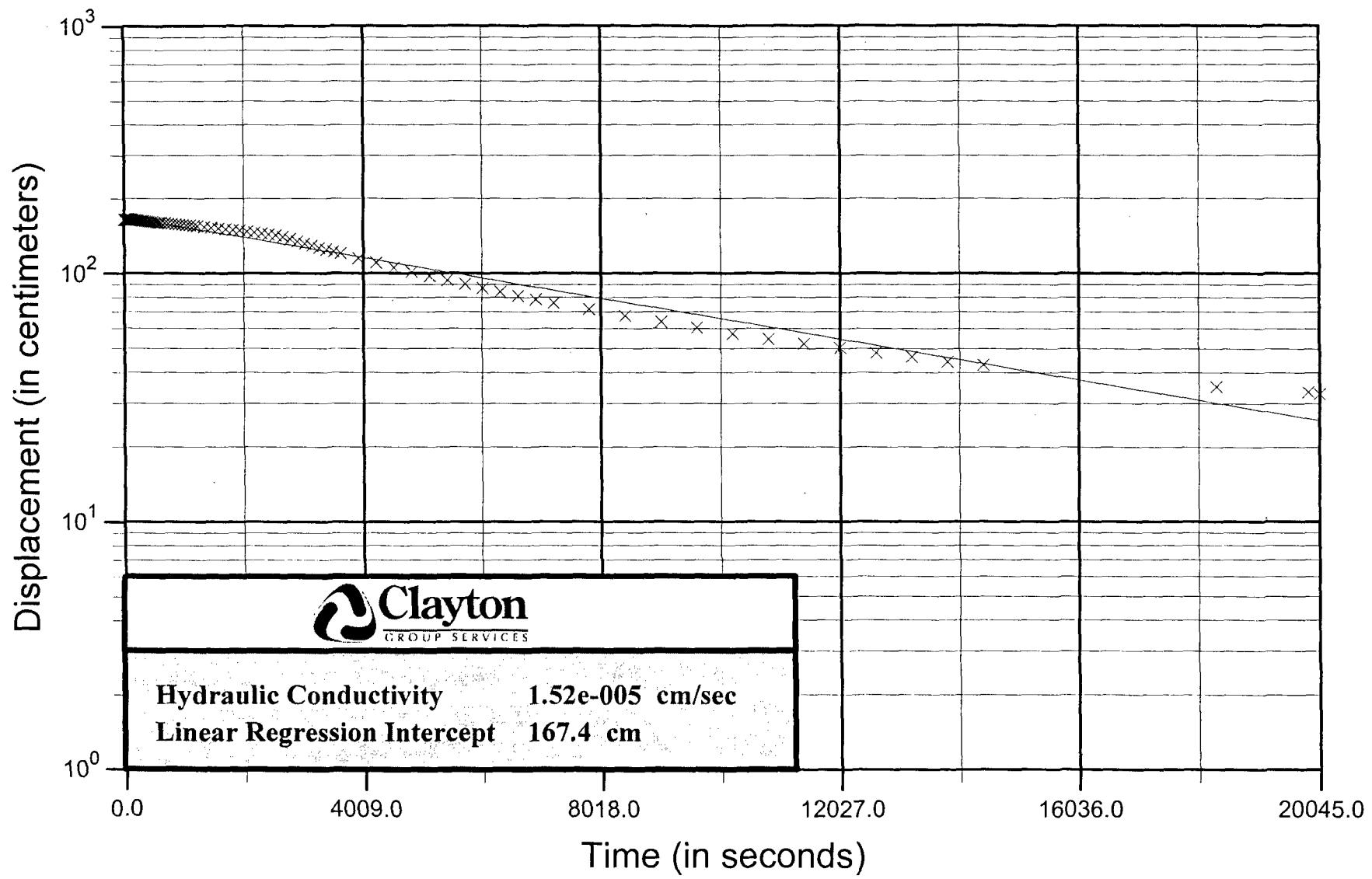
Top of screen (water above screen)=0'

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	14:08:02	0	53.98	0	-2.1	0.00
5/29/2003	14:08:02	0.3	54	0.849	-1.8	25.88
5/29/2003	14:08:02	0.6	54.03	0.876	-1.5	26.70
5/29/2003	14:08:03	0.9	54.03	0.734	-1.2	22.37
5/29/2003	14:08:03	1.2	54.03	0.11	-0.9	3.35
5/29/2003	14:08:03	1.5	54.03	1.038	-0.6	31.64

Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	14:08:04	1.8	54.03	0.924	-0.3	28.16
5/29/2003	14:08:04	2.1	54.03	1.095	0.0	33.38
5/29/2003	14:08:04	2.4	54.03	1.055	0.3	32.16
5/29/2003	14:08:04	2.7	54.03	0.801	0.6	24.41
5/29/2003	14:08:05	3	54.03	0.736	0.9	22.43
5/29/2003	14:08:05	3.3	54.03	0.634	1.2	19.32
5/29/2003	14:08:05	3.6	54.03	0.553	1.5	16.86
5/29/2003	14:08:06	3.9	54.03	0.499	1.8	15.21
5/29/2003	14:08:06	4.2	54.03	0.443	2.1	13.50
5/29/2003	14:08:06	4.5	54.05	0.413	2.4	12.59
5/29/2003	14:08:07	4.8	54.05	0.386	2.7	11.77
5/29/2003	14:08:07	5.1	54.05	0.359	3.0	10.94
5/29/2003	14:08:07	5.4	54.05	0.353	3.3	10.76
5/29/2003	14:08:07	5.7	54.05	0.315	3.6	9.60
5/29/2003	14:08:08	6	54.05	0.297	3.9	9.05
5/29/2003	14:08:08	6.4	54.05	0.282	4.3	8.60
5/29/2003	14:08:08	6.7	54.05	0.268	4.6	8.17
5/29/2003	14:08:09	7.1	54.05	0.255	5.0	7.77
5/29/2003	14:08:09	7.5	54.05	0.245	5.4	7.47
5/29/2003	14:08:10	8	54.05	0.238	5.9	7.25
5/29/2003	14:08:10	8.4	54.05	0.226	6.3	6.89
5/29/2003	14:08:11	8.9	54.05	0.216	6.8	6.58
5/29/2003	14:08:11	9.5	54.05	0.209	7.4	6.37
5/29/2003	14:08:12	10	54.03	0.212	7.9	6.46
5/29/2003	14:08:12	10.6	54.03	0.207	8.5	6.31
5/29/2003	14:08:13	11.3	54.03	0.201	9.2	6.13
5/29/2003	14:08:14	11.9	54.03	0.201	9.8	6.13
5/29/2003	14:08:14	12.6	54.03	0.191	10.5	5.82
5/29/2003	14:08:15	13.4	54.03	0.193	11.3	5.88
5/29/2003	14:08:16	14.2	54.03	0.191	12.1	5.82
5/29/2003	14:08:17	15	54.03	0.187	12.9	5.70
5/29/2003	14:08:18	15.9	54.03	0.182	13.8	5.55
5/29/2003	14:08:19	16.8	54.03	0.18	14.7	5.49
5/29/2003	14:08:20	17.8	54.03	0.176	15.7	5.36
5/29/2003	14:08:21	18.9	54.03	0.174	16.8	5.30
5/29/2003	14:08:22	20	54.03	0.17	17.9	5.18
5/29/2003	14:08:23	21.2	54.03	0.17	19.1	5.18
5/29/2003	14:08:24	22.4	54.03	0.168	20.3	5.12
5/29/2003	14:08:25	23.8	54.03	0.166	21.7	5.06
5/29/2003	14:08:27	25.2	54.03	0.162	23.1	4.94
5/29/2003	14:08:28	26.7	54.03	0.158	24.6	4.82
5/29/2003	14:08:30	28.2	54.03	0.157	26.1	4.79
5/29/2003	14:08:31	29.8	54.03	0.155	27.7	4.72
5/29/2003	14:08:33	31.5	54.03	0.151	29.4	4.60
5/29/2003	14:08:35	33.3	54.03	0.149	31.2	4.54
5/29/2003	14:08:37	35.2	54.03	0.145	33.1	4.42
5/29/2003	14:08:39	37.3	54.03	0.143	35.2	4.36
5/29/2003	14:08:41	39.5	54.03	0.141	37.4	4.30
5/29/2003	14:08:43	41.8	54.03	0.139	39.7	4.24

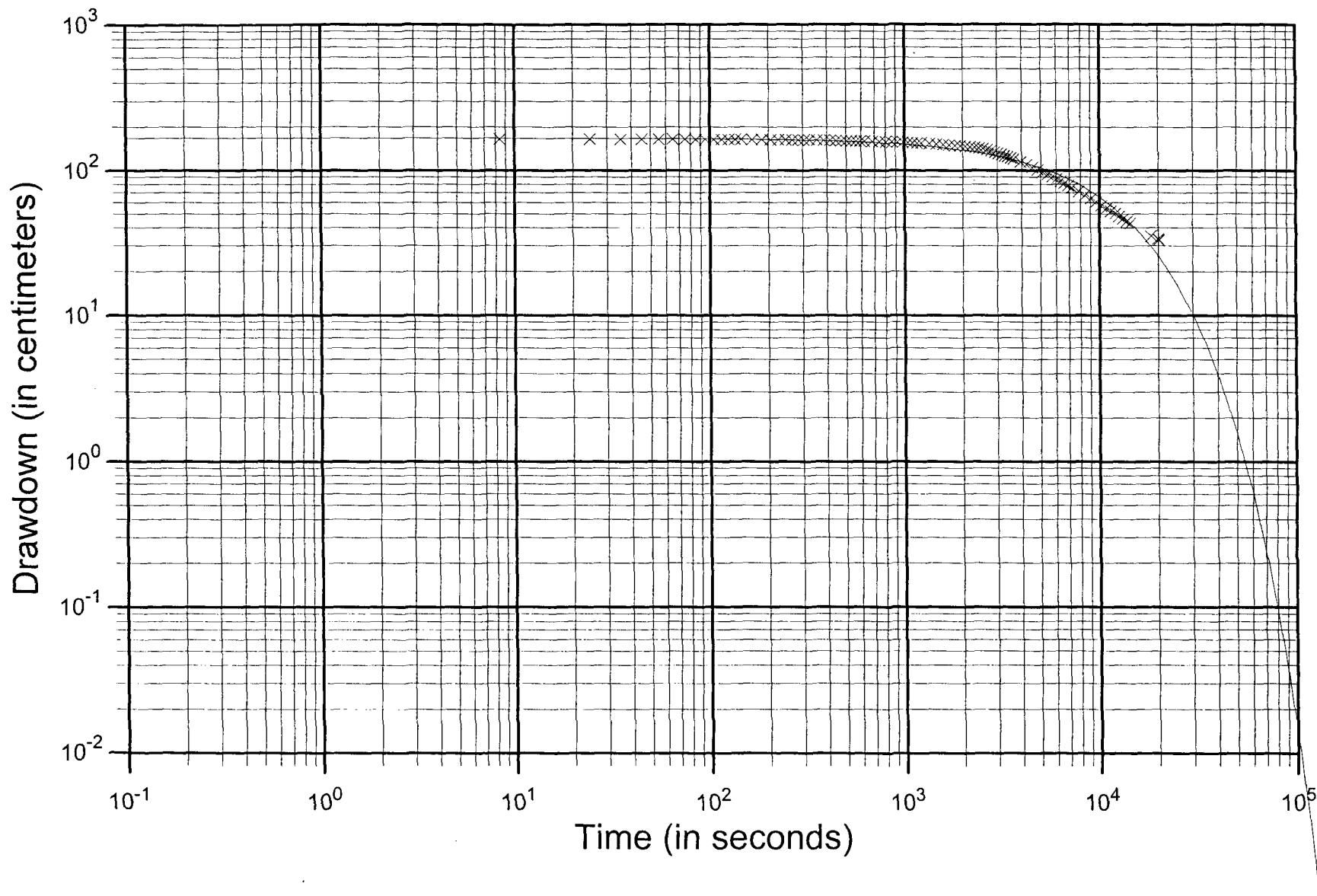
Date	Time	ET (sec)	Chan[1]	Chan[2]	Time (sec)	Head (cm)
			Fahrenheit	Feet H2O		
5/29/2003	14:08:46	44.3	54.03	0.137	42.2	4.18
5/29/2003	14:08:49	46.9	54.03	0.135	44.8	4.11
5/29/2003	14:08:51	49.7	54.03	0.131	47.6	3.99
5/29/2003	14:08:54	52.6	54.03	0.133	50.5	4.05
5/29/2003	14:08:57	55.7	54.03	0.131	53.6	3.99
5/29/2003	14:09:01	59	54.03	0.131	56.9	3.99
5/29/2003	14:09:04	62.5	54	0.125	60.4	3.81
5/29/2003	14:09:08	66.2	54	0.129	64.1	3.93
5/29/2003	14:09:12	70.1	54	0.123	68.0	3.75
5/29/2003	14:09:16	74.3	54	0.122	72.2	3.72
5/29/2003	14:09:20	78.7	54	0.12	76.6	3.66
5/29/2003	14:09:25	83.4	54	0.118	81.3	3.60
5/29/2003	14:09:30	88.4	54	0.118	86.3	3.60
5/29/2003	14:09:35	93.7	54	0.116	91.6	3.54
5/29/2003	14:09:41	99.3	54	0.116	97.2	3.54
5/29/2003	14:09:47	105.2	54	0.114	103.1	3.47
5/29/2003	14:09:53	111.5	54	0.114	109.4	3.47
5/29/2003	14:10:00	118.1	54	0.114	116.0	3.47
5/29/2003	14:10:07	125.1	54	0.114	123.0	3.47
5/29/2003	14:10:14	132.6	54	0.114	130.5	3.47
5/29/2003	14:10:22	140.5	54	0.112	138.4	3.41
5/29/2003	14:10:31	148.9	54	0.11	146.8	3.35
5/29/2003	14:10:39	157.8	54	0.112	155.7	3.41
5/29/2003	14:10:49	167.2	54	0.112	165.1	3.41
5/29/2003	14:10:59	177.2	54	0.112	175.1	3.41
5/29/2003	14:11:09	187.8	54	0.108	185.7	3.29
5/29/2003	14:11:21	199	54	0.11	196.9	3.35
5/29/2003	14:11:33	210.9	54	0.11	208.8	3.35
5/29/2003	14:11:45	223.5	54	0.11	221.4	3.35
5/29/2003	14:11:58	236.8	54	0.11	234.7	3.35
5/29/2003	14:12:13	250.9	54	0.108	248.8	3.29
5/29/2003	14:12:27	265.8	54	0.108	263.7	3.29
5/29/2003	14:12:43	281.6	53.98	0.108	279.5	3.29
5/29/2003	14:13:00	298.4	53.98	0.11	296.3	3.35
5/29/2003	14:13:18	316.2	53.98	0.108	314.1	3.29
5/29/2003	14:13:37	335	53.98	0.108	332.9	3.29
5/29/2003	14:13:57	354.9	53.98	0.108	352.8	3.29
5/29/2003	14:14:18	376	53.98	0.108	373.9	3.29
5/29/2003	14:14:40	398.4	53.98	0.11	396.3	3.35

MW1122S Rising Head Slug Test



Bouwer and Rice Method (1976)

MW1122S RH (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

PROJECT INFORMATION							
Project Name				Lockformer		Lisle, IL	
Project No.				15-65263.60-001		Well ID	
Field Personnel				J. Campbell		MW-1122S	
EQUIPMENT INFORMATION							
Data Logger Type / Model No.				Aquistar DL-8A			
Transducer Type / Model No.				15 psi			
Slug Length / Volume				None			
GENERAL INFORMATION							
Static Groundwater Elevation		ft MSL					
Ground Surface Elevation		ft MSL					
Top of Casing Elevation		ft MSL					
Well Stick-up		1.8	ft	54.9	cm		
Depth to Water		42.92	ft	1308.2	cm		
Diameter of Well Casing		2	in	5.1	cm		
Diameter of Borehole at Screen		8	in	20.3	cm		
Screen Interval		45.1 - 47.1	ft BG	1375 - 1436	cm BG		
Screen Length		2	ft	61.0	cm		
Base of Boring		47.5	ft BG	1447.8	cm BG		
Base of Upper Confining Unit		---	ft BG	0.0	cm BG		
Top of Lower Confining Unit		---	ft BG	0.0	cm BG		
Saturated Thickness (b)		---	ft	0.0	cm		
Static Height of Water in Well		6.48	ft	197.5	cm		
Geology of Aquifer		Silty Clay					
SLUG TEST MEASUREMENT INFORMATION							
Parameter		Falling Head			Rising Head		
Initial Water Level Above Transducer			ft		cm	4.5	ft
Initial Drawdown/Recovery			ft		cm	5.42	ft
SLUG TEST RESULTS							
Falling H	Rising H	Analysis Method		Parameter	Calculated Value and Units		
<p>Notes: Well was bailed dry prior to starting Rising Head test</p> <hr/> <hr/> <hr/>							

SLUG TEST DATA FOR MW1122S RISING HEAD

Project Name: Lockformer
Project Number: 15-65263

Date : 2-Jan-04
Field Personnel: Joe Campbell

Static Water Column Height Before Test (feet):

5.97E+00

Data Logger: Aquistar DL-8A
Transducer: 15 psi
Method: Pump Down

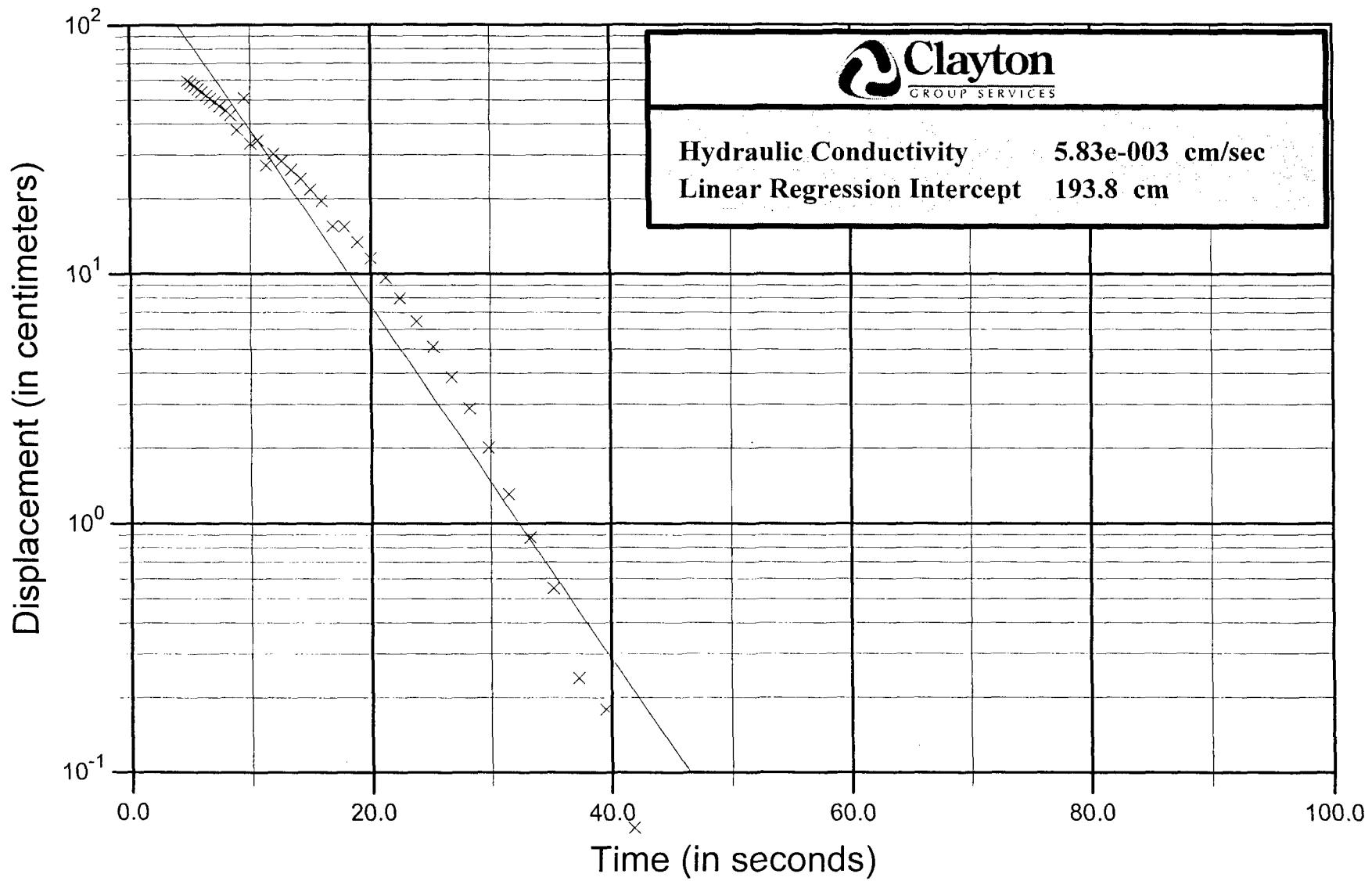
Maximum Displacement of Water Column (cm):

165.2

Date	Time	Analog#01		Time (sec)	Displacement (cm)	Displacement (feet)
		AMP.....	FT.....			
01/02/04	8:13:29	5.52E-01		0.0	165.2	5.4
01/02/04	8:13:38	5.52E-01		8.4	165.2	5.4
01/02/04	8:13:54	5.52E-01		24.5	165.2	5.4
01/02/04	8:14:04	5.52E-01		35.2	165.2	5.4
01/02/04	8:14:14	5.52E-01		45.2	165.2	5.4
01/02/04	8:14:24	5.52E-01		55.2	165.2	5.4
01/02/04	8:14:34	5.63E-01		65.1	164.9	5.4
01/02/04	8:14:44	5.63E-01		75.1	164.9	5.4
01/02/04	8:14:54	5.74E-01		85.2	164.6	5.4
01/02/04	8:15:04	5.74E-01		95.2	164.6	5.4
01/02/04	8:15:14	5.74E-01		105.2	164.6	5.4
01/02/04	8:15:24	5.74E-01		115.2	164.6	5.4
01/02/04	8:15:34	5.74E-01		125.1	164.6	5.4
01/02/04	8:15:44	5.85E-01		135.2	164.2	5.4
01/02/04	8:15:54	5.85E-01		145.2	164.2	5.4
01/02/04	8:16:14	5.96E-01		165.2	163.9	5.4
01/02/04	8:16:34	5.85E-01		185.2	164.2	5.4
01/02/04	8:16:54	5.96E-01		205.2	163.9	5.4
01/02/04	8:17:14	5.96E-01		225.1	163.9	5.4
01/02/04	8:17:34	6.06E-01		245.1	163.6	5.4
01/02/04	8:17:54	6.17E-01		265.2	163.2	5.4
01/02/04	8:18:14	6.17E-01		285.1	163.2	5.4
01/02/04	8:18:34	6.28E-01		305.2	162.9	5.3
01/02/04	8:18:54	6.28E-01		325.2	162.9	5.3
01/02/04	8:19:24	6.50E-01		355.2	162.2	5.3
01/02/04	8:19:54	6.61E-01		385.2	161.9	5.3
01/02/04	8:20:24	6.71E-01		415.2	161.6	5.3
01/02/04	8:20:54	6.82E-01		445.2	161.3	5.3
01/02/04	8:21:24	6.82E-01		475.2	161.3	5.3
01/02/04	8:21:54	7.04E-01		505.2	160.6	5.3
01/02/04	8:22:24	7.04E-01		535.2	160.6	5.3
01/02/04	8:22:54	7.15E-01		565.2	160.3	5.3
01/02/04	8:23:24	7.25E-01		595.2	159.9	5.2
01/02/04	8:23:54	7.25E-01		625.2	159.9	5.2
01/02/04	8:24:54	7.47E-01		685.2	159.3	5.2
01/02/04	8:25:54	7.69E-01		745.2	158.6	5.2
01/02/04	8:26:54	7.80E-01		805.2	158.3	5.2
01/02/04	8:27:54	8.01E-01		865.2	157.6	5.2
01/02/04	8:28:54	8.12E-01		925.2	157.3	5.2

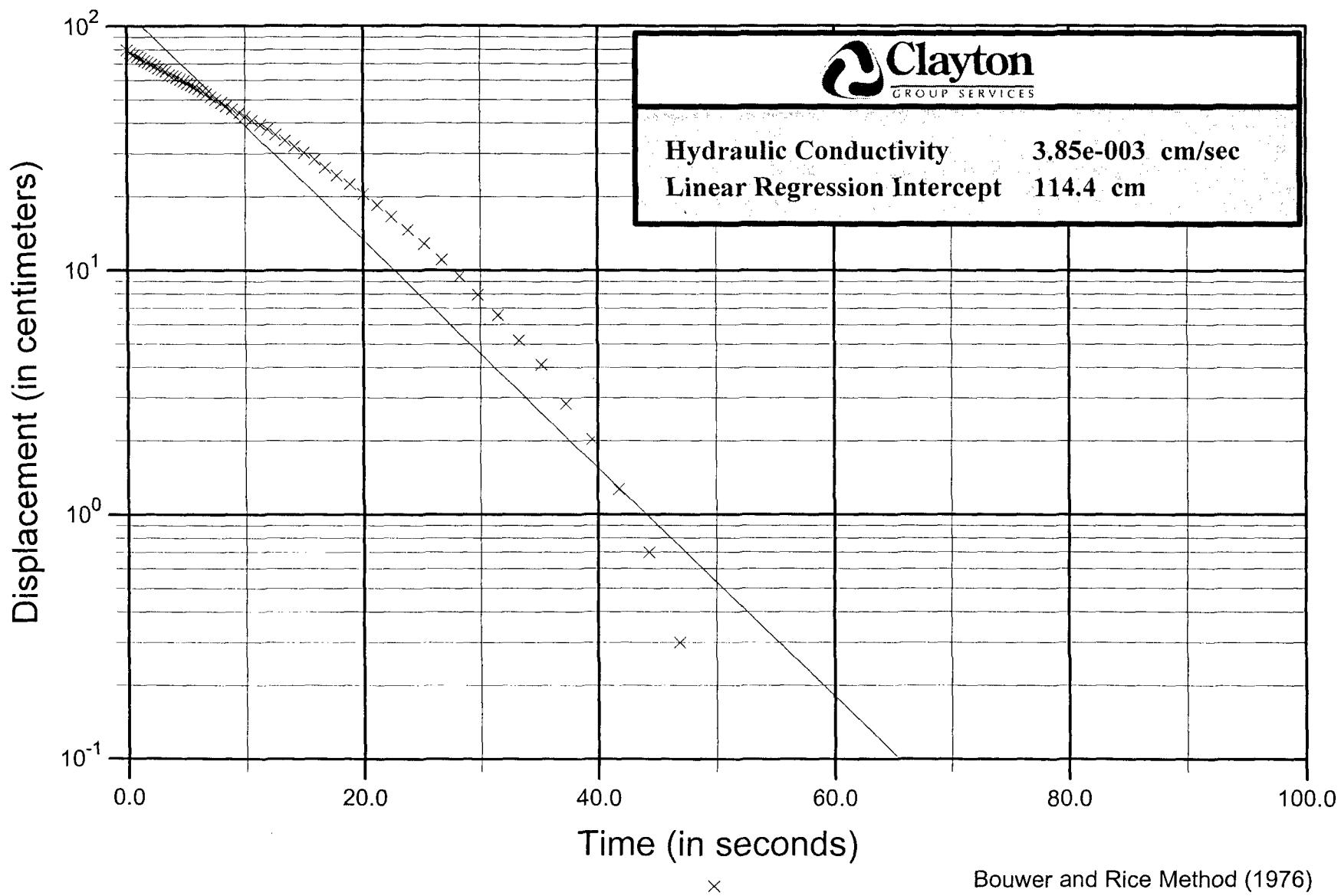
Analog#01					
Date	Time	AMP.....	Time (sec)	Displacement (cm)	Displacement (feet)
		FT.....			
01/02/04	8:29:54	8.23E-01	985.2	157.0	5.1
01/02/04	8:30:54	8.45E-01	1045.2	156.3	5.1
01/02/04	8:31:54	8.55E-01	1105.2	156.0	5.1
01/02/04	8:32:54	8.77E-01	1165.2	155.3	5.1
01/02/04	8:33:54	8.88E-01	1225.2	155.0	5.1
01/02/04	8:35:54	9.31E-01	1345.2	153.7	5.0
01/02/04	8:37:54	9.64E-01	1465.2	152.7	5.0
01/02/04	8:39:54	1.01E+00	1585.2	151.4	5.0
01/02/04	8:41:54	1.04E+00	1705.2	150.4	4.9
01/02/04	8:43:54	1.07E+00	1825.2	149.4	4.9
01/02/04	8:45:54	1.09E+00	1945.2	148.7	4.9
01/02/04	8:47:54	1.15E+00	2065.2	147.1	4.8
01/02/04	8:49:54	1.18E+00	2185.2	146.1	4.8
01/02/04	8:51:54	1.22E+00	2305.2	144.8	4.7
01/02/04	8:53:54	1.27E+00	2425.2	143.4	4.7
01/02/04	8:55:54	1.30E+00	2545.2	142.4	4.7
01/02/04	8:57:54	1.38E+00	2665.2	140.1	4.6
01/02/04	8:59:54	1.47E+00	2785.2	137.2	4.5
01/02/04	9:01:54	1.57E+00	2905.2	134.2	4.4
01/02/04	9:03:54	1.66E+00	3025.2	131.6	4.3
01/02/04	9:05:54	1.73E+00	3145.2	129.2	4.2
01/02/04	9:07:54	1.82E+00	3265.2	126.6	4.2
01/02/04	9:09:54	1.88E+00	3385.2	124.6	4.1
01/02/04	9:11:54	1.96E+00	3505.2	122.3	4.0
01/02/04	9:13:54	2.02E+00	3625.2	120.3	3.9
01/02/04	9:18:54	2.20E+00	3925.2	115.0	3.8
01/02/04	9:23:54	2.35E+00	4225.2	110.4	3.6
01/02/04	9:28:54	2.51E+00	4525.2	105.5	3.5
01/02/04	9:33:54	2.64E+00	4825.2	101.5	3.3
01/02/04	9:38:54	2.77E+00	5125.2	97.6	3.2
01/02/04	9:43:54	2.89E+00	5425.2	93.9	3.1
01/02/04	9:48:54	3.00E+00	5725.2	90.6	3.0
01/02/04	9:53:54	3.11E+00	6025.2	87.3	2.9
01/02/04	9:58:54	3.21E+00	6325.2	84.4	2.8
01/02/04	10:03:54	3.30E+00	6625.2	81.4	2.7
01/02/04	10:08:54	3.39E+00	6925.2	78.7	2.6
01/02/04	10:13:54	3.48E+00	7225.2	76.1	2.5
01/02/04	10:23:54	3.62E+00	7825.2	71.8	2.4
01/02/04	10:33:54	3.76E+00	8425.2	67.5	2.2
01/02/04	10:43:54	3.88E+00	9025.2	63.9	2.1
01/02/04	10:53:54	3.98E+00	9625.2	60.6	2.0
01/02/04	11:03:54	4.09E+00	10225.2	57.3	1.9
01/02/04	11:13:54	4.18E+00	10825.2	54.7	1.8
01/02/04	11:23:54	4.26E+00	11425.2	52.3	1.7
01/02/04	11:33:54	4.32E+00	12025.2	50.4	1.7
01/02/04	11:43:54	4.40E+00	12625.2	48.1	1.6
01/02/04	11:53:54	4.45E+00	13225.2	46.4	1.5
01/02/04	12:03:54	4.52E+00	13825.2	44.4	1.5
01/02/04	12:13:54	4.56E+00	14425.2	43.1	1.4
01/02/04	13:19:00	4.82E+00	18330.8	35.2	1.2
01/02/04	13:44:19	4.87E+00	19849.4	33.5	1.1
01/02/04	13:47:34	4.89E+00	20044.4	32.9	1.1

Bouwer & Rice Analysis for MW-1114S (FH2)

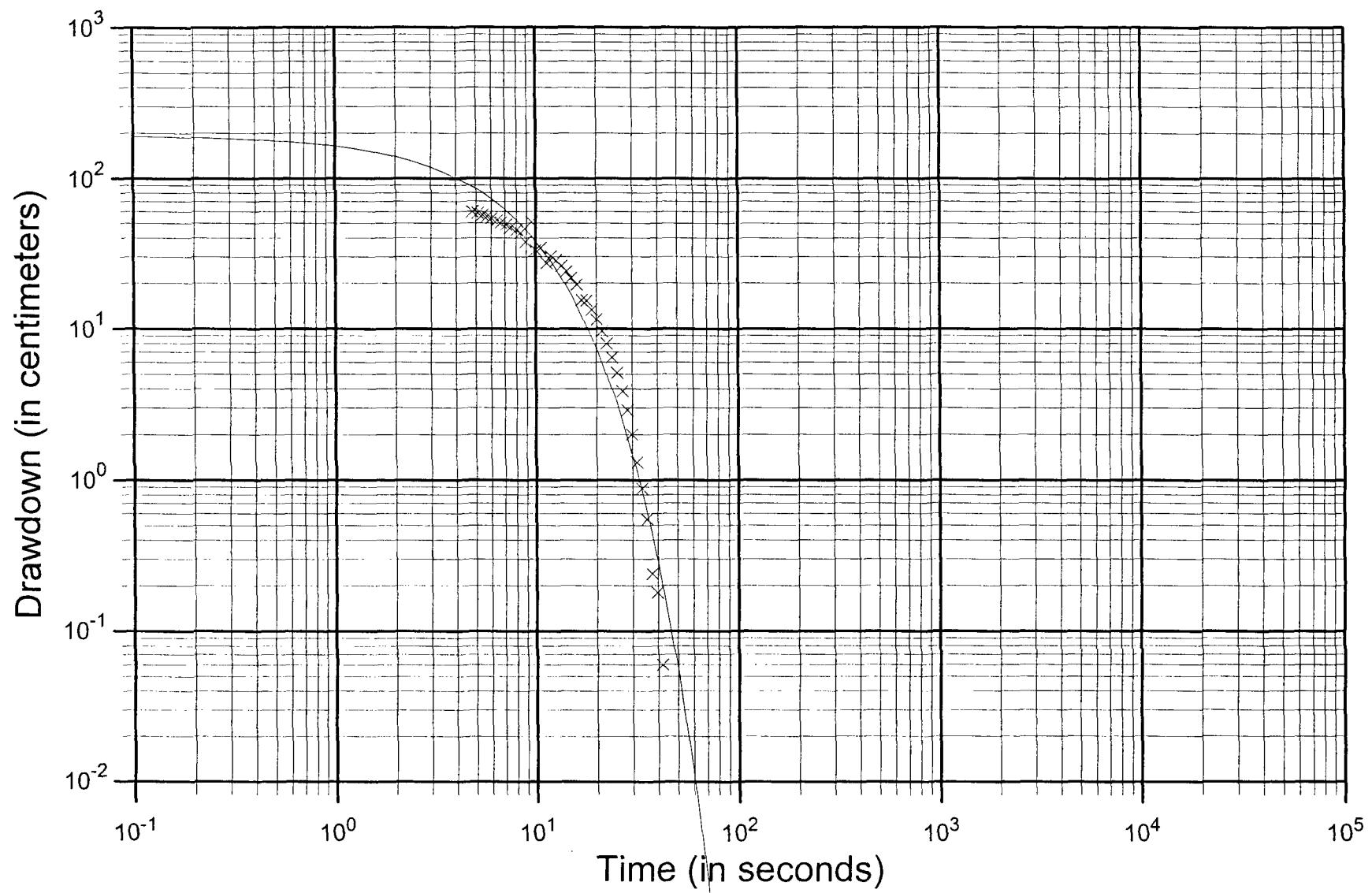


Bouwer and Rice Method (1976)

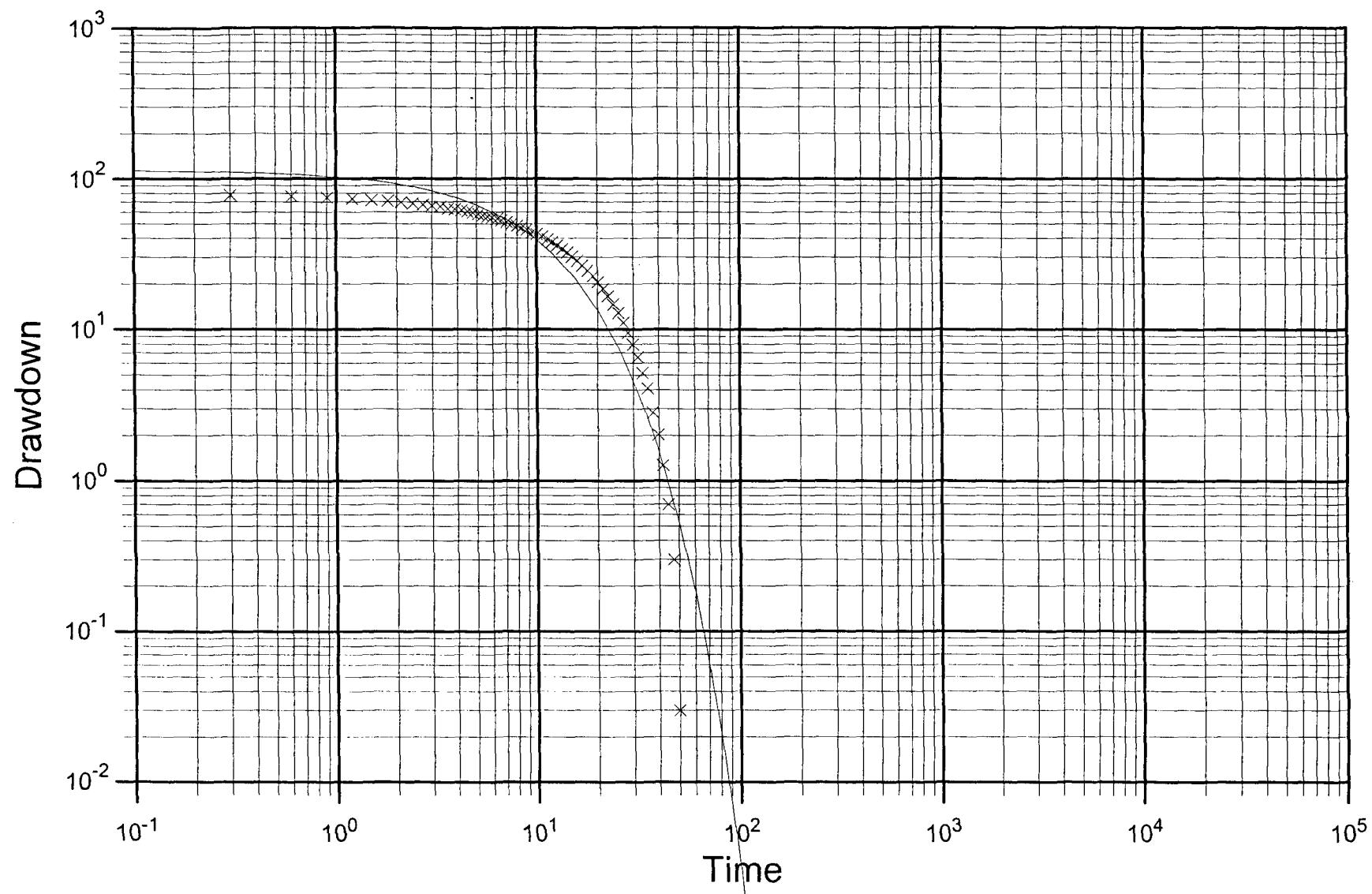
Bouwer & Rice Analysis for MW-1114S (RH2)



MW1114S FH2 (Plot vs. Predicted Curve)



MW1114S RH2 (Plot vs. Predicted Curve)



SLUG TEST DATA FORM

In-Situ Inc. MiniTroll Pro
 Report generated: 1/28/2004 16:25:47
 Report from file: ...\\SN05914 2004-01-28 144058 MW-1114S FH.bin
 Win-Situ Version 4.41
 Serial number: 5914
 Firmware Version 3.09
 Unit name: MiniTROLL
 Test name: MW-1114S FH
 Test defined on: 1/28/2004 14:39:56
 Test started on: 1/28/2004 14:40:58
 Test stopped on: 1/28/2004 14:59:24
 Test extracted on: N/A N/A
 Data gathered using Logarithmic testing
 Maximum time between data points: Seconds.
 Number of data samples: 111
 TOTAL DATA SAMPLES 111
 Channel number [1]
 Measurement type: Temperature
 Channel name: Temperature
 Channel number [2]
 Measurement type: Pressure
 Channel name: Pressure
 Sensor Range: 30 PSIG.
 Specific gravity: 1
 Mode: TOC
 User-defined reference: 0 Feet H2O
 Referenced on: test start
 Pressure head at reference: 18.307 Feet H2O

Date	Time	ET (sec)	Chan[1]	Chan[2]
			Fahrenheit	Feet H2O
	1/28/2004	14:40:58	0	54.17 0
	1/28/2004	14:40:58	0.3	54.24 -5.825
	1/28/2004	14:40:59	0.6	54.26 -6.342
	1/28/2004	14:40:59	0.9	54.26 -2.728
	1/28/2004	14:40:59	1.2	54.26 -2.161
	1/28/2004	14:41:00	1.5	54.26 2.806
	1/28/2004	14:41:00	1.8	54.26 -0.01
	1/28/2004	14:41:00	2.1	54.26 -0.825
	1/28/2004	14:41:01	2.4	54.26 -0.877
	1/28/2004	14:41:01	2.7	54.26 -0.243

1/28/2004	14:41:01	3	54.26	-0.339
1/28/2004	14:41:01	3.3	54.26	-0.291
1/28/2004	14:41:02	3.6	54.26	-0.218
1/28/2004	14:41:02	3.9	54.26	-0.116
1/28/2004	14:41:02	4.2	54.28	-0.1
1/28/2004	14:41:03	4.5	54.28	-0.035
1/28/2004	14:41:03	4.8	54.28	0.017
1/28/2004	14:41:03	5.1	54.26	0.061
1/28/2004	14:41:04	5.4	54.28	0.109
1/28/2004	14:41:04	5.7	54.28	0.161
1/28/2004	14:41:04	6	54.28	0.207
1/28/2004	14:41:05	6.4	54.28	0.261
1/28/2004	14:41:05	6.7	54.28	0.317
1/28/2004	14:41:05	7.1	54.28	0.371
1/28/2004	14:41:06	7.5	54.28	0.432
1/28/2004	14:41:06	8	54.28	0.492
1/28/2004	14:41:07	8.4	54.28	0.555
1/28/2004	14:41:07	8.9	54.28	0.74
1/28/2004	14:41:08	9.5	54.28	0.309
1/28/2004	14:41:08	10	54.24	0.887
1/28/2004	14:41:09	10.6	54.24	0.85
1/28/2004	14:41:09	11.3	54.24	1.085
1/28/2004	14:41:10	11.9	54.24	0.983
1/28/2004	14:41:11	12.6	54.24	1.047
1/28/2004	14:41:12	13.4	54.24	1.12
1/28/2004	14:41:12	14.2	54.24	1.189
1/28/2004	14:41:13	15	54.24	1.264
1/28/2004	14:41:14	15.9	54.24	1.335
1/28/2004	14:41:15	16.8	54.24	1.469
1/28/2004	14:41:16	17.8	54.24	1.473
1/28/2004	14:41:17	18.9	54.24	1.539
1/28/2004	14:41:18	20	54.24	1.6
1/28/2004	14:41:19	21.2	54.24	1.662
1/28/2004	14:41:21	22.4	54.24	1.717
1/28/2004	14:41:22	23.8	54.24	1.767
1/28/2004	14:41:23	25.2	54.24	1.811
1/28/2004	14:41:25	26.7	54.24	1.852
1/28/2004	14:41:26	28.2	54.24	1.884
1/28/2004	14:41:28	29.8	54.24	1.913
1/28/2004	14:41:30	31.5	54.24	1.936
1/28/2004	14:41:31	33.3	54.24	1.95
1/28/2004	14:41:33	35.2	54.24	1.961
1/28/2004	14:41:35	37.3	54.24	1.971
1/28/2004	14:41:38	39.5	54.24	1.973
1/28/2004	14:41:40	41.8	54.24	1.977
1/28/2004	14:41:42	44.3	54.24	1.977
1/28/2004	14:41:45	46.9	54.24	1.979
1/28/2004	14:41:48	49.7	54.24	1.979
1/28/2004	14:41:51	52.6	54.24	1.979
1/28/2004	14:41:54	55.7	54.21	1.978
1/28/2004	14:41:57	59	54.21	1.978
1/28/2004	14:42:01	62.5	54.21	1.978

1/28/2004	14:42:04	66.2	54.21	1.978
1/28/2004	14:42:08	70.1	54.21	1.978
1/28/2004	14:42:12	74.3	54.21	1.978
1/28/2004	14:42:17	78.7	54.21	1.978
1/28/2004	14:42:22	83.4	54.21	1.978
1/28/2004	14:42:27	88.4	54.21	1.976
1/28/2004	14:42:32	93.7	54.21	1.98
1/28/2004	14:42:37	99.3	54.21	1.978
1/28/2004	14:42:43	105.2	54.21	1.98
1/28/2004	14:42:50	111.5	54.19	1.98
1/28/2004	14:42:56	118.1	54.19	1.98
1/28/2004	14:43:03	125.1	54.19	1.978
1/28/2004	14:43:11	132.6	54.19	1.98
1/28/2004	14:43:19	140.5	54.19	1.976
1/28/2004	14:43:27	148.9	54.19	1.978
1/28/2004	14:43:36	157.8	54.19	1.978
1/28/2004	14:43:45	167.2	54.19	1.98
1/28/2004	14:43:55	177.2	54.19	1.978
1/28/2004	14:44:06	187.8	54.19	1.976
1/28/2004	14:44:17	199	54.19	1.978
1/28/2004	14:44:29	210.9	54.19	1.978
1/28/2004	14:44:42	223.5	54.17	1.976
1/28/2004	14:44:55	236.8	54.17	1.978
1/28/2004	14:45:09	250.9	54.17	1.976
1/28/2004	14:45:24	265.8	54.17	1.978
1/28/2004	14:45:40	281.6	54.17	1.98
1/28/2004	14:45:57	298.4	54.17	1.982
1/28/2004	14:46:14	316.2	54.17	1.989
1/28/2004	14:46:33	335	54.17	1.993
1/28/2004	14:46:53	354.9	54.17	1.98
1/28/2004	14:47:14	376	54.17	1.976
1/28/2004	14:47:37	398.4	54.17	1.98
1/28/2004	14:48:00	422.1	54.17	1.982
1/28/2004	14:48:25	447.2	54.17	1.978
1/28/2004	14:48:52	473.8	54.17	1.978
1/28/2004	14:49:20	502	54.17	1.98
1/28/2004	14:49:50	531.9	54.17	1.98
1/28/2004	14:50:22	563.5	54.17	1.978
1/28/2004	14:50:55	597	54.17	1.978
1/28/2004	14:51:31	632.5	54.17	1.976
1/28/2004	14:52:08	670.1	54.17	1.976
1/28/2004	14:52:48	709.9	54.17	1.978
1/28/2004	14:53:30	752.1	54.17	1.974
1/28/2004	14:54:15	796.8	54.17	1.976
1/28/2004	14:55:02	844.2	54.17	1.978
1/28/2004	14:55:53	894.4	54.17	1.974
1/28/2004	14:56:46	947.5	54.17	1.974
1/28/2004	14:57:42	1003.8	54.17	1.972
1/28/2004	14:58:42	1063.4	54.17	1.972

4.8	59.80
5.1	58.46
5.4	57.00
5.7	55.41
6	54.01
6.4	52.36
6.7	50.66
7.1	49.01
7.5	47.15
8	45.32
8.4	43.40
8.9	37.76
9.5	50.90
10	33.28
10.6	34.41
11.3	27.25
11.9	30.36
12.6	28.41
13.4	26.18
14.2	24.08
15	21.79
15.9	19.63
16.8	15.54
17.8	15.42
18.9	13.41
20	11.55
21.2	9.66
22.4	7.99
23.8	6.46
25.2	5.12
26.7	3.87
28.2	2.90
29.8	2.01
31.5	1.31
33.3	0.88
35.2	0.55
37.3	0.24
39.5	0.18
41.8	0.06

In-Situ Inc. MiniTroll Pro
Report generated: 1/28/2004 16:29:20
Report from file: ...\\SN05914 2004-01-28 150150 MW-1114S RH.bin
Win-Situ Version 4.41

Serial number: 5914
Firmware Version 3.09
Unit name: MiniTROLL

Test name: MW-1114S RH

Test defined on: 1/28/2004 15:01:14
Test started on: 1/28/2004 15:01:50
Test stopped on: 1/28/2004 15:03:37
Test extracted on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Seconds.
Number of data samples: 71

TOTAL DATA SAMPLES 71

Channel number [1]
Measurement type: Temperature
Channel name: Temperature

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 30 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.717 Feet H2O

Date	Time	ET (sec)	Chan[1]	Chan[2]	Properly Referenced	Data Data (cm)
			Fahrenheit	Feet H2O		
1/28/2004	15:01:50	0	54.17	0	2.64	79.94
1/28/2004	15:01:51	0.3	54.21	-0.07	2.57	77.82
1/28/2004	15:01:51	0.6	54.24	-0.114	2.526	76.49
1/28/2004	15:01:51	0.9	54.24	-0.16	2.48	75.09
1/28/2004	15:01:52	1.2	54.24	-0.205	2.435	73.73
1/28/2004	15:01:52	1.5	54.24	-0.257	2.383	72.16
1/28/2004	15:01:52	1.8	54.24	-0.291	2.349	71.13
1/28/2004	15:01:52	2.1	54.26	-0.333	2.307	69.86
1/28/2004	15:01:53	2.4	54.24	-0.376	2.264	68.55
1/28/2004	15:01:53	2.7	54.26	-0.418	2.222	67.28

1/28/2004	15:01:53	3	54.26	-0.452	2.188	66.25
1/28/2004	15:01:54	3.3	54.26	-0.481	2.159	65.37
1/28/2004	15:01:54	3.6	54.26	-0.554	2.086	63.16
1/28/2004	15:01:54	3.9	54.26	-0.572	2.068	62.62
1/28/2004	15:01:55	4.2	54.26	-0.602	2.038	61.71
1/28/2004	15:01:55	4.5	54.26	-0.641	1.999	60.53
1/28/2004	15:01:55	4.8	54.26	-0.675	1.965	59.50
1/28/2004	15:01:55	5.1	54.26	-0.714	1.926	58.32
1/28/2004	15:01:56	5.4	54.26	-0.75	1.89	57.23
1/28/2004	15:01:56	5.7	54.26	-0.783	1.857	56.23
1/28/2004	15:01:56	6	54.26	-0.818	1.822	55.17
1/28/2004	15:01:57	6.4	54.26	-0.852	1.788	54.14
1/28/2004	15:01:57	6.7	54.26	-0.898	1.742	52.75
1/28/2004	15:01:58	7.1	54.26	-0.943	1.697	51.39
1/28/2004	15:01:58	7.5	54.26	-0.987	1.653	50.05
1/28/2004	15:01:58	8	54.28	-1.034	1.606	48.63
1/28/2004	15:01:59	8.4	54.26	-1.083	1.557	47.15
1/28/2004	15:01:59	8.9	54.28	-1.127	1.513	45.81
1/28/2004	15:02:00	9.5	54.28	-1.182	1.458	44.15
1/28/2004	15:02:00	10	54.24	-1.229	1.411	42.73
1/28/2004	15:02:01	10.6	54.24	-1.281	1.359	41.15
1/28/2004	15:02:02	11.3	54.24	-1.339	1.301	39.39
1/28/2004	15:02:02	11.9	54.24	-1.393	1.247	37.76
1/28/2004	15:02:03	12.6	54.24	-1.452	1.188	35.97
1/28/2004	15:02:04	13.4	54.24	-1.514	1.126	34.10
1/28/2004	15:02:05	14.2	54.24	-1.575	1.065	32.25
1/28/2004	15:02:05	15	54.24	-1.639	1.001	30.31
1/28/2004	15:02:06	15.9	54.24	-1.7	0.94	28.46
1/28/2004	15:02:07	16.8	54.24	-1.769	0.871	26.37
1/28/2004	15:02:08	17.8	54.24	-1.833	0.807	24.44
1/28/2004	15:02:09	18.9	54.21	-1.897	0.743	22.50
1/28/2004	15:02:10	20	54.24	-1.962	0.678	20.53
1/28/2004	15:02:12	21.2	54.24	-2.027	0.613	18.56
1/28/2004	15:02:13	22.4	54.24	-2.09	0.55	16.65
1/28/2004	15:02:14	23.8	54.24	-2.156	0.484	14.66
1/28/2004	15:02:16	25.2	54.24	-2.215	0.425	12.87
1/28/2004	15:02:17	26.7	54.24	-2.275	0.365	11.05
1/28/2004	15:02:19	28.2	54.24	-2.327	0.313	9.48
1/28/2004	15:02:20	29.8	54.24	-2.377	0.263	7.96
1/28/2004	15:02:22	31.5	54.24	-2.423	0.217	6.57
1/28/2004	15:02:24	33.3	54.24	-2.469	0.171	5.18
1/28/2004	15:02:26	35.2	54.24	-2.504	0.136	4.12
1/28/2004	15:02:28	37.3	54.24	-2.546	0.094	2.85
1/28/2004	15:02:30	39.5	54.24	-2.573	0.067	2.03
1/28/2004	15:02:32	41.8	54.21	-2.598	0.042	1.27
1/28/2004	15:02:35	44.3	54.24	-2.617	0.023	0.70
1/28/2004	15:02:37	46.9	54.24	-2.63	0.01	0.30
1/28/2004	15:02:40	49.7	54.21	-2.639	0.001	0.03
1/28/2004	15:02:43	52.6	54.21	-2.64	0	0.00
1/28/2004	15:02:46	55.7	54.21	-2.64		
1/28/2004	15:02:49	59	54.21	-2.642		
1/28/2004	15:02:53	62.5	54.21	-2.642		

1/28/2004	15:02:57	66.2	54.21	-2.64
1/28/2004	15:03:00	70.1	54.21	-2.64
1/28/2004	15:03:05	74.3	54.21	-2.642
1/28/2004	15:03:09	78.7	54.21	-2.64
1/28/2004	15:03:14	83.4	54.21	-2.639
1/28/2004	15:03:19	88.4	54.21	-2.639
1/28/2004	15:03:24	93.7	54.21	-2.639
1/28/2004	15:03:30	99.3	54.21	-2.637
1/28/2004	15:03:36	105.2	54.21	-2.635

0	79.94
0.3	77.82
0.6	76.49
0.9	75.09
1.2	73.73
1.5	72.16
1.8	71.13
2.1	69.86
2.4	68.55
2.7	67.28
3	66.25
3.3	65.37
3.6	63.16
3.9	62.62
4.2	61.71
4.5	60.53
4.8	59.50
5.1	58.32
5.4	57.23
5.7	56.23
6	55.17
6.4	54.14
6.7	52.75
7.1	51.39
7.5	50.05
8	48.63
8.4	47.15
8.9	45.81
9.5	44.15
10	42.73
10.6	41.15
11.3	39.39
11.9	37.76
12.6	35.97
13.4	34.10
14.2	32.25
15	30.31
15.9	28.46
16.8	26.37
17.8	24.44
18.9	22.50
20	20.53
21.2	18.56
22.4	16.65
23.8	14.66
25.2	12.87
26.7	11.05
28.2	9.48
29.8	7.96
31.5	6.57
33.3	5.18
35.2	4.12

37.3	2.85
39.5	2.03
41.8	1.27
44.3	0.70
46.9	0.30
49.7	0.03
52.6	0.00



ATTACHMENT M-3

MODELING DATA SHEETS



**LEACHING FACTOR (LF_{sw}) DATASHEETS
USING A DEFAULT DILUTION FACTOR OF 20**

Datasheet RBCA-XIII. LFsw

Datasheet RBCA-XIII is to be used to propose the leaching factor calculated by the equation in Appendix C, Table C of TACO: Equation R14 (residential, industrial/commercial and constructin worker scenarios). The use of Equations R20 and R24 in TACO are necessary to generate some of the input values for Equation R14. Since the values in Datasheet RBCA-XI are used in this evaluation, this Datasheet must also be submitted.

k_s (gwater/gsoil)*	See below	ρ_s (g/cm³)**	1.72
H' (unitless)***	See below	θ_{ws} (unitless)**	0.35
U_{gw} (cm/yr)****	229.90	θ_{as} (unitless)**	0.03
K (cm/yr)	76,632.00		
i (unitless)	0.003		
δ_{gw} (cm)	200		
I (cm/yr)	7		
W (cm)	914		

* k_s value reported on Datasheet RBCA-XI

** Physical Soil Properties (see Datasheet B)

Chemical Properties (see Datasheet C) * U_{gw} value as calculated using Equation R24

Chemical Name	k_s (gwater/gsoil)	H' (unitless)	LFsw (mg/Lwater)/(mg/kgsoil)
Trichloroethylene	1.1620	4.22E-001	3.64E-02

Datasheet RBCA-XI. ks

Datasheet RBCA-XI is to be used to propose the soil water sorption coefficient (ks) calculated by the equation in Appendix C, Table C of TACO: Equation R20 (residential, industrial/commercial and construction worker scenarios).

Land Use Scenario: Residential, Industrial/Commercial and Construction Worker

Chemical Name	Surface Soils				Subsurface Soils			
	pH	Koc*	ks (g/gsoil)/(g/cm ³ water)	pH	Koc*	foc** (g/g)	ks (g/gsoil)/(g/cm ³ water)	
Trichloroethylene	6.80	66E+002	0.006	0.99600	6.80	1.66E+002	0.007	1.16200

* Chemical Properties (see Datasheet C)

** Physical Soil Parameters (see Datasheet B)